

Welcome to the HMMWV Quick Reference Guide Third Edition.

This book contains Digest Articles, PS Magazine Articles and SOUMs that provide solutions to a variety of reported problems on the HMMWV. These articles were published Aug 93 through Dec 96.

To use this guide, just determine the functional group code your problem falls within and go to the index found on pages 2-19. The index is grouped by functional group code and is in order by group code. Then just pick your subject and locate the page.

The information contained in this reference guide is unclassified.

We hope you find this guide useful. Any comments or questions regarding this book can be directed to:

Ms. Jody McInerney,
AMSTA-IM-HLA, DSN: 786-5481,
Commercial: (810) 574-5481
or email: mcinernj@cc.tacom.army.mil

In case you did not know the HMMWV Maintenance Team and Supply Team have become one under Integrated Materiel Management Center (IMMC).

Below is a list of phone numbers that will get you the HMMWV Team.

(DSN is 786-XXXX and Commercial (810) 574-XXXX)

Maintenance Related: Ext. 7566
5481
5763

Supply Related: Ext. 7493
7566
8142

The information presented here wouldn't be available if it wasn't for you (the user) telling us about your problems. So please continue to submit your SMARTS, Suggestions, QDR/EIRs, and 2028s.

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Chapter 00

**MISCELLANEOUS
INFO**

4-5. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

AOAP Intervals

POC:

Ms. Patricia Grashik, AMSTA-IM-HIA, DSN 786-5225, Commercial (810) 574-5225
grashikp@cc.tacom.army.mil

DEFICIENCY:

There is no hour meter installed on HMMWVS. Units who's mission requires a lot of idling time would benefit from having an hour meter installed for AOAP sampling.

COMMENTS:

A. at commander's discretion units can add an hourmeter to the dash board just to the right of the light switch and under the air restriction indicator. (see figure 4-1) Because there's not much room on the dash, the meter should be no more than 2 1/4 in. diameter. Also, the meter needs to be hermetically sealed due to the deep water fording mission requirements.

B. We recommend using either of the hour meters listed below. One comes with the flange assembled on it and the other requires a flange be added during installation. There may be other hour meters you can use. Make sure, however, they meet both the size and waterproofing requirements. Recommended parts information for the hour meters and attaching hardware is:

<u>NSN</u>	<u>TYPE</u>	<u>COST</u>
6645-01-224-8973	Hour Meter with Flange	\$175.92
6645-00-255-1370	Hour Meter without Flange (use flange NSN 6645-00-239-5743\$7.86).	\$114.35
5305-00-993-9268	Screw, Machine	\$ 00.20

4-5. Tact. Trucks cont.

C. Use wire 29A on the master switch for your power source.

D. Once the hour meter is installed, take your AOAP sample every 100 hours/3,000 miles for engine operation and 300 hours/6,000 miles for transmission operation. Use hours or miles for your sampling interval depending on which measurement occurs first.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit

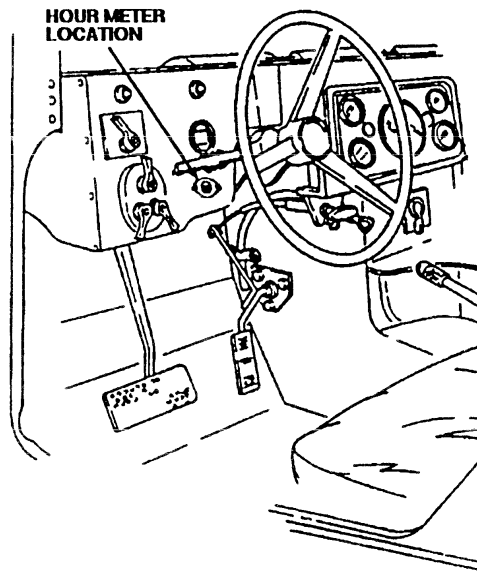


FIGURE 4-1

4-3. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Army Oil Analysis Program (AOAP) Sampling

POC:

Ms. Patricia Grashik, AMSTA-IM-HLA, DSN 786-7566, Commercial (810) 574-7566
grashikp@cc.tacom.army.mil

COMMENTS:

A. For easier access to the sampling locations, elbow, NSN 4730-00-277-5553, can be attached to the sampling valves. Secure a piece of hose, NSN 4720-01-159-5796, to the elbow with clamp, NSN 5340-00-954-6014. The elbow can remain installed on the sampling valve, but ensure you remove the hose and clamp after you obtain your sample. Dirt and debris could accumulate in the hose, if it is kept attached, contaminating your next sample.

B. This is an alternative method for sampling, if you are not experiencing a clearance problem, continue to use the sampling valves with no modification. If you prefer to use the sampling pump, NSN 4930-01-119-4030, that is also acceptable. The sampling method to use is at your commander's discretion.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit

8-5. Misc. Vehicles

MODEL:

All Tactical Wheeled Vehicles and Trailers

SUBJECT:

Cleaning Rustproofed Vehicles

POC:

Mr. Gary Mitchell, AMSTA-MTA, DSN 786-7346, Commercial (313) 574-7346

DEFICIENCY:

Keeping your equipment's clean as possible is not only a requirement in accordance with your technical Manuals, but it's also smart. Dirt, grease, oil, and other contamination can cover up serious problems. But, using the wrong methods or equipment to clean tactical vehicles can damage, loosen, or remove rustproofing compounds, leaving your equipment more susceptible to corrosion damage.

COMMENTS:

A. Do not use steam cleaners on equipment that has been rustproofed. Steam and hot water (over 160 degrees F) softens and loosens the rustproofing compound, and pressurized steam or water may remove it completely, resulting in a need to re-rustproof your equipment.

B. The use of steam cleaners and high pressure/hot water washers on equipment that is NOT rustproofed is authorized, but you still need to take certain precautions. Never direct water at electrical connectors, electronic parts, seals, or injection pumps. Doing so could lead to malfunctioning equipment.

PROCEDURE:

A. A "combination" type steam/pressure cleaner can be used in the "pressure" mode as long as the water temperature doesn't exceed 160 degrees F and the pressure doesn't exceed 500 psi (3448 kPa).

B. There are numerous suppliers of powerwash equipment, and TB43-0213 lists some of them. The TB in no way endorses one product or supplier over another. The list is provided for convenience only and is not all inclusive; it's also subject to change without notice. You should select a powerwash unit based on your particular requirements.

C. Cleaning with a hot water / high pressure washer and detergent is very effective and does not damage the rustproofing, or other components, as long as you adhere to the temperature/pressure restrictions. In addition, this type of cleaner meets requirements of DOD 5030.49R and AR 700-93 that equipment returning from OCONUS be free of agricultural pests and contraband, and Air Force Reg 76-6 for cleaning vehicles that will be air transported..

D. See TB 43-0213 for more detailed rustproofing and cleaning information.

8-5. Misc. Vehicles cont.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

All

8-3. Misc. Vehicles

MODEL:

All TACOM Equipment with Diesel/Turbine Engines

SUBJECT:

Conversion from Diesel Fuel to JP8

POC:

Mrs. Landis Kazsuk, AMSTA-IM-MTA, DSN 786-8288, Commercial (810) 574-8288 kazsukl@cc.tacom.army.mil

DEFICIENCY-

A. JP8 has a cleansing effect, it causes microbiological growth and other fuel contaminants to break free from fuel cells and lines. As these contaminants travel through the fuel system, they plug up your fuel filters.

B. JP8 also causes a slight decrease in the engine's rated power, but will have no effect on engine durability. The slight power decrease is caused by JP8 having a lower energy content than diesel fuel. The power decrease will only be apparent when the vehicle is at full load.

COMMENTS:

A. JP8 is designated as the 'Single Fuel on the Battlefield' as part of the DOD Fuel Standardization Policy. This means that eventually you will be converting to JP8 and you may experience fuel filter plugging.

B. The conversion process will not be complete for several years; it's being phased-in by regions. We're providing this information for your use as you are affected.

C. Although you may initially have problems due to the conversion, the program goals are to:

- (1) Provide a safer, less volatile fuel.
- (2) Improve cold weather starting.

8-3. Misc. Vehicles cont.

- (3) Reduce the number of fuels on the battlefield.
- (4) Increase tactical flexibility and POL logistics supportability.

D. The problems you experience are going to depend on the type of equipment you have, how often you operate it, climatic conditions, etc. For example, microbiological growth will be more severe in fuel systems that are rarely exercised and in high humidity areas. So when you convert, initially, your filters will clog more quickly and require replacement more often. If on the other hand, you have a piece of equipment that you use on a daily basis and you're in a fairly dry environment, you shouldn't have too bad of a problem.

PROCEDURES:

Replace fuel filters as needed. On the average, your fuel filter plugging problem should go away after two complete refuels.

PUBLICATIONS AFFECTED:

We will update vehicle TMs to reflect JP8 as an authorized fuel.

LEVEL OF MAINTENANCE:

All levels

4-5. Tactical Trucks

MODEL:

HMMWV M998 Series

SUBJECT:

Engine and Transmission Oil Cooler and Radiator Cleaning

POC:

Ms. Leona Milas, AMSTA-IM-MTA, DSN 786-7346, Commercial (810) 574-7346
milasl@cc.tacom.army.mfl

COMMENTS:

Using high water pressure when cleaning the engine and transmission oil cooler and radiator, can cause damage. High water pressure should not be directed on the cooler or radiator.

PUBLICATIONS AFFECTED:

TM9-2320-280-20

LEVEL OF MAINTENANCE:

Unit

MODEL:

HMMWV

SUBJECT:

Getting In and Out of the Rear of the Vehicle

POC:

Ms. Jody McInerney, AMSTA-IM-MTA, DSN 786-7346, Commercial (810) 574-7346
mcinemj@cc.tacom.army.mil

COMMENTS:

It's been brought to our attention that soldiers are using the tow pintle as a step to get in and out of the rear of the vehicle. We recommend you not use the tow pintle as a step. The tow pintle is designed to swivel 360 degrees and when stepped on can twist, causing your foot to slip and injury to personnel. The tailgate should be lowered to ease getting in and out of the rear of the vehicle.

PUBLICATIONS AFFECTED:

TM9-2320-280-10

LEVEL OF MAINTENANCE:

Crew

3-8. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Enrollment of HMMWVs in the Army Oil Analysis Program (AOAP)

POC:

Ms. Patricia Grashik, AMSTA-IM-MTA, DSN 786-7713, Commercial (810) 574-7713, grashikp@cc.tacom.army.mil

COMMENTS:

A. Effective 1 Oct 95, HMMWV engines and transmissions are enrolled in the Army Oil Analysis Program (AOAP). The sampling interval for the HMMWV engine is every six months. For the transmission, the sampling interval is every 12 months.

B. Use the vehicle serial number with an "E" (engine) suffix for engine serialization and the transmission serial number located on the transmission data plate for AOAP tracking. If the transmission data plate is missing, use the vehicle serial with a "T" (transmission) suffix.

C. Because HMMWVs weren't part of AOAP, sampling valves aren't installed on vehicles with serial numbers 100,000 and above. Units may install sampling valves, NSN 4820-00-845-1096, at their own cost. Valves are installed on the engine and transmission oil cooler. (see figure 3-4)

D. On some vehicles, the power steering oil cooler line may block access to the engine sampling valve location. If access is blocked, or units don't want to install sampling valves, Oil sampling pump, NSN 4930-01-119-4030, and 1/4" nonmetallic tubing, NSN 4720-00-964-1433 can be used to obtain samples through the dipstick filler tube.

PUBLICATIONS AFFECTED :

TM9-2320-280-20-1

LEVEL OF MAINTENANCE:

Unit

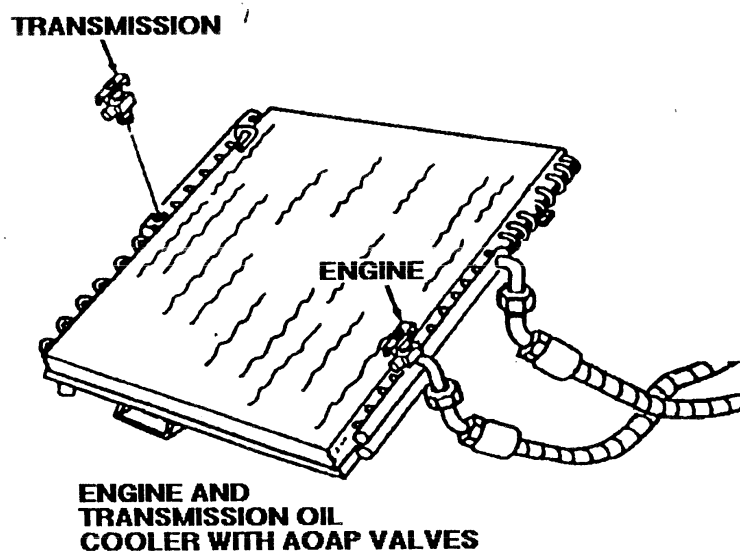


FIGURE 3-4

8-4. Tactical Trucks

MODEL:

All Tactical Wheeled Vehicle Engines

SUBJECT:

Commercial Heavy Duty Oil Update

POC: Ms. Landis Kazsuk, AMSTA-MTA, DSN 786-7416

DEFICIENCY:

The purpose of this article is to provide information pertaining to ordering and using Commercial Heavy Duty Oil (CHDO) in tactical wheeled vehicle engines.

COMMENTS:

Commercial Heavy Duty Oil is authorized as an alternative to MIL- L-2104 for use in all tactical wheeled vehicle engines only.

NOTE

Combat (tracked) vehicle applications, all tactical (wheeled vehicle non-engine applications, and special purpose equipment (i.e., materiel handling, construction, construction support, trailer/tanker pony auxiliary engine) applications are not authorized to use the Commercial Heavy Duty Oil. Users should continue to use lubricants identified in the appropriate lubrication orders for all equipment except tactical wheeled vehicle engines.

B. We encourage maintenance managers and supply personnel to order CHDO products over MIL-L-2104 whenever possible. CHDO costs less than MIL-L-2104 and is delivered directly from the vendor in CONUS. When you order in pallet sized quantities, you should receive your shipment in less than 15 days. Direct vendor delivery is not available for OCONUS customers. All OCONUS requirements will be filled from depot stocks.

8-4. Tactical Trucks

c. The following is a complete list of authorized available CHDO products:

<u>GRADE</u>	<u>UNIT OF ISSUE</u>	<u>NSN</u>	<u>PALLET LOAD</u>	<u>FY93 PRICE</u>
15W40	BX (12 1 QT)	9150-01-351-9019	N/A	\$ 10.57/BX
15W40	CO (5 GAL)	9150-01-352-2962	36 CO	\$ 17.60/CO
15W40	DR (55 GAL)	9150-01-351-9018	4 DR	\$ 165.59/DR
3OW	BX (12 1 QT)	9150-01-351-9016	80 BX	\$ 10.53/BX
3OW	CO (5 GAL)	9150-01-352-8090	36 CO	\$ 17.55/CO
3OW	DR (55 GAL)	9150-01-351-9015	4 DR	\$ 168.82/DR
4OW	DR (55 GAL)	9150-01-352-8091	4 DR	\$ 172.86/DR

D. REMINDER: Only use Commercial Heavy Duty Oil in tactical wheeled vehicle engines.

PUBLICATIONS AFFECTED:

All tactical wheeled vehicle lubrication orders will be updated to include both Commercial Heavy Duty Oil and MIL-L-2104 oil during their next scheduled change/revision.

LEVEL OF MAINTENANCE:

Operator and Unit

MODEL:

HMMWV, M998 Series

SUBJECT:

Fabricate Engine/Transmission Support Sling.

POC:

Mr. Daniel Dudek, AMSTA-MTA, DSN 786-7416

DEFICIENCY:

When the engine or transmission is removed from the vehicle for maintenance, the remaining component, (engine or transmission) is not adequately supported. If a vehicle is moved because of limited shop space or tactical movement, damage to the remaining component and the vehicle can occur.

COMMENTS:

A. Two suggestions submitted through the Army Ideas for Excellence Program (AIEP) were recently adopted resulting in the following instruction. Both suggestions recommended support devices for the engine and transmission while one or the other component is removed from the vehicle for maintenance. The first device supports the components from underneath by hanging between the frame rails. The second device supports the components from above braced between the dash panel and the vehicle tunnel. Either device used independently will safely support the engine or transmission during maintenance. Individual preference and work area will determine which device best suits your needs.

B. Direct Support or General Support maintenance personnel can fabricate either of the support devices. Fabrication and installation can be accomplished using the following material, parts, and procedures.

MATERIALS:

Parts and Materials to be Requisitioned for Bottom Support Sling:

3-27. Tactical Trucks

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
9540-00-197-9865	Channel, aluminum	6 ft
5305-00-269-2804	Bolt	6
5310-00-655-9544	Nut	10
9510-00-813-5322	Bar, metal	5 ft
5310-01-280-5796	Washer	16

Parts to be Fabricated from Materials Requisitioned for Bottom Support Sling:

<u>NOMENCLATURE</u>	<u>QTY</u>
Support hook	2
Bottom support sling	1
Brace	2

Parts and Materials to be Requisitioned for Overhead Support Sling:

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
9520-00-061-6507	Angle, structural	1 ft
4010-00-174-4879	Chain, welded link	4 ft
5306-00-225-9091	Bolt	6
9520-00-277-4925	Angle, structural	3 ft
9520-00-294-0986	Bar, metal	2 ft
5306-00-402-2674	Eyebolt, R.H.	1
5306-00-411-6457	Eyebolt, L.H.	1
5310-00-660-3381	Nut	6
5340-00-995-6335	Turnbuckle	1
5310-01-358-0596	Washer	12

Parts to be Fabricated from Materials Requisitioned for Overhead Support Sling:

<u>NOMENCLATURE</u>	<u>QTY</u>
Engine bracket	2
Transmission bracket, L.H.	1

3-27. Tactical Trucks

<u>NOMENCLATURE</u>	<u>QTY</u>
Transmission bracket, R.H.	1
A-frame brace	1
Center support beam	1
Inner floor support	1
Outer floor support	1
Engine support chain	1
Transmission support chain	1

PROCEDURE:

Bottom Support Sling:

A. Fabrication.

- (1) Using NSN 9510-00-813-5322 metal bar, fabricate two support hooks. (see figure 3-58)
- (2) Using NSN 9540-00-197-9865 aluminum channel, fabricate two braces. (see figure 3-59)
- (3) Using NSN 9540-00-197-9865 aluminum channel, fabricate support. (see figure 3-60)

B. Assembly.

- (1) Position two braces (1) on support (7) and secure with six NSN 5305-00-269-2804 bolts (3), twelve NSN 5310-01-280-5796 washers (2), and six NSN 5310-00-655-9544 nuts (8). (see figure 3-61)
- (2) Install two support hooks (4) on support (7) and secure with four NSN 5310-01-280-5796 washers (5) and four NSN 5310-00-655-9544 nuts (6).

C. Bottom Support Sling Installation.

NOTE

Bottom support sling must be installed prior to engine or transmission removal. When performing step 1, ensure support hooks are positioned flat on frame rail to prevent damage to oil and vent lines. When performing step 1, ensure nuts on support books are adjusted evenly to keep from bending engine or transmission oil pan.

3-27. Tactical Trucks

cont.

- (1) Position bottom support sling (1) under engine or transmission oil pan (2). (see figures 3-62 and 3-63)
- (2) Slide support hooks (3) over frame rails (4) and hand tighten four nuts (5) until support sling (1) is snug against oil pan (2). Then tighten nuts (5) two more complete turns.

Overhead Support Sling:

A. Fabrication.

- (1) Using NSN 9510-00-294-0986 metal bar, fabricate two engine brackets. (see figure 3-64)
- (2) Using NSN 9510-00-294-0986 metal bar, fabricate L.H. transmission bracket. (see figure 3-65)
- (3) Using NSN 9510-00-294-0986 metal bar, fabricate R.H. transmission bracket. (see figure 3-66)
- (4) Using NSN 9520-00-061-6507 structural angle, fabricate A-frame brace. (see figure 3-67)
- (5) Using NSN 9520-00-277-4925 structural angle, fabricate center support beam. (see figure 3-68)
- (6) Using NSN 9520-00-277-4925 structural angle, fabricate inner floor support. (see figure 3-69)
- (7) Using NSN 9520-00-277-4925 structural angle, fabricate outer floor support. (see figure 3-70)
- (8) Using NSN 4010-00-174-4879 welded chain, fabricate engine support chain. (see figure 3-71)
- (9) Using NSN 4010-00-174-4879 welded chain, fabricate transmission support chain. (see figure 3-71)

B. Assembly.

- (1) Position outer floor support (4) on inner floor support (3) and weld into place. (see figure 3-72)
- (2) Position center support beam (1) on inner floor support (3) and weld into place.
- (3) Position A-frame brace (2) on center support beam (1) and weld into place.

3-27. Tactical Trucks

cont.

NOTE

Perform step 4 if rigging overhead support sling for transmission use.

Perform step 5 if rigging overhead support sling for engine use.

- (4) Position L.H. and R.H. transmission brackets (1) to the ends of transmission support chain (14) and secure with two NSN 5305-00-225-9091 bolts (2), four NSN 5310-01-358-0596 washers (3), and two NSN 5310-00-660-3381 nuts (13). (see figure 3-73)
- (5) Position two engine brackets (1) to the ends of engine support chain (14) and secure with two NSN 5305-00-225-9091 bolts (2), four NSN 5310-01-358-0596 washers (3), and two NSN 5310-00-660-3381 nuts (13). (see figure 3-74)
- (6) Install NSN 5306-00-411-6457 L.H. eyebolt (4) and NSN 5306-00-402-2674 R.H. eyebolt (6) in NSN 5340-00-995-6335 turnbuckle (5). (see figures 3-73 or 3-74)

NOTE

Perform steps 7 and 8 if rigging overhead support sling for transmission use.

Perform steps 9 and 10 if rigging overhead support sling for engine use.

- (7) Position R.H. eyebolt (6) to hole (9) in overhead support sling (11) and secure with NSN 5305-00-225-9091 bolt (7), two NSN 5310-01-358-0596 washers (8), and NSN 5310-00-660-3381 nut (12). (see figure 3-73) Do not tighten nut (12). Do not use hole (10) in overhead support sling (11).
- (8) Using center link, install transmission support chain (14) on L.H. eyebolt (4) and secure with NSN 5305-00-225-9091 bolt (2), two NSN 5310-01-358-0596 washers (3), and NSN 5310-00-660-3381 nut (13).
- (9) Position R.H. eyebolt (6) to hole (10) in overhead support sling (11) and secure with NSN 5305-00-225-9091 bolt (8), two NSN 5310-01-358-0596 washers (9), and NSN 5310-00-660-3381 nut (12). (see figure 3-74) Do not tighten nut (12). Do not use hole (7) in overhead support sling (11).
- (10) Using center link, install engine support chain (14) on L.H. eyebolt (4) and secure with NSN 5305-00-225-9091 bolt (2), two NSN 5310-01-358-0596 washers (3), and NSN 5310-00-660-3381 nut (13).

C. Overhead Support Sling Installation for Transmission Support:

3-27. Tactical Trucks

cont.

NOTE

Perform the engine removal procedure in TM9-2320-280-34 to point prior to securing transmission for engine removal. Perform steps 1 through 3 to secure transmission.

- (1) Position support assembly (2) on floor (3) and A-frame (1). (see figure 3-75)

NOTE

Use converter housing cover bolts to install transmission brackets on transmission housing.

When performing step 2, it might be necessary to shift engine support chain link on L.H. eyebolt to adjust for securing transmission to transmission bracket.

- (2) Secure transmission brackets (7) to transmission housing (4) with four existing bolts (5) and washers (6). (see figure 3-75)
- (3) Tighten turnbuckle (9) to remove slack from transmission bracket chain (8).
- (4) Continue engine removal procedure. (Refer to TM9-2320-280-34.)

D. Overhead Support Sling Installation for Engine Support.

NOTE

Perform transmission removal procedure in TM9-2320-280-34 to point prior to supporting engine for transmission removal. Perform steps 1 through 4 to secure engine.

- (1) Position overhead support sling (2) on floor (6) and A-frame (1). (see figure 3-76)

NOTE

When performing step 2, use converter housing cover bolts and washers to install engine brackets on back of cylinder heads.

When performing step 2, it might be necessary to shift engine support chain link on L.H. eyebolt to adjust for securing engine cylinder head to engine bracket.

**3-27. Tactical Trucks
cont.**

- (2) Secure engine brackets (3) to engine cylinder heads (7) with two existing bolts (5) and washers (4). (see figure 3-76)
- (3) Tighten turnbuckle (9) to remove slack from engine bracket chains (8).
- (4) Continue transmission removal procedure. (Refer to TM9-2320-280-34.)

PUBLICATIONS AFFECTED:

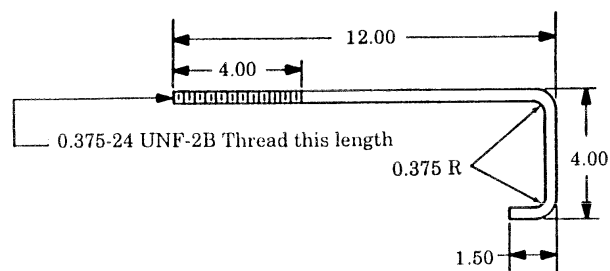
None

LEVEL OF MAINTENANCE:

Direct Support and General Support

NOTES:

- (1) All dimensions are in inches.
- (2) Material: Steel, Carbon, Flatbar
1018, Cold Finished,
IAW Spec. ASTM A108
0.375 thick
- (3) Remove all burrs and sharp edges.

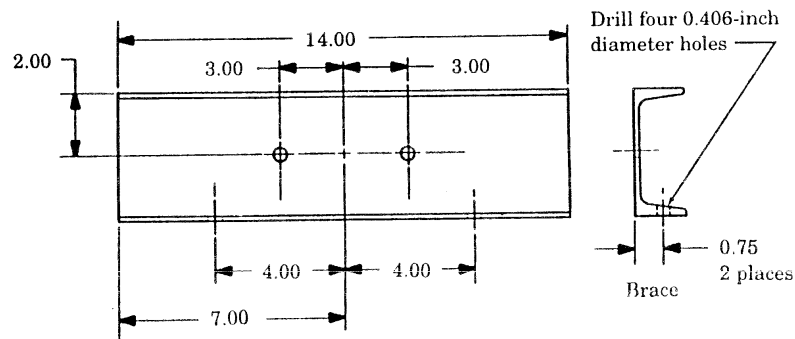


Support Hook

FIGURE 3-58

NOTES:

- (1) All dimensions are in inches.
- (2) Material: Aluminum Alloy, Channel,
Structural, QQ-A-200/18 6061 T6
Extruded, 0.188 thick, 1.58 flanged
- (3) Remove all burrs and sharp edges.



Brace

FIGURE 3-59

NOTES:

- (1) All dimensions are in inches.
- (2) Material: Aluminum Alloy, Channel, Structural, QQ-A-200/18 6061 T6
Extruded, 0.188 thick, 1.58 flanged
- (3) Remove all burrs and sharp edges.

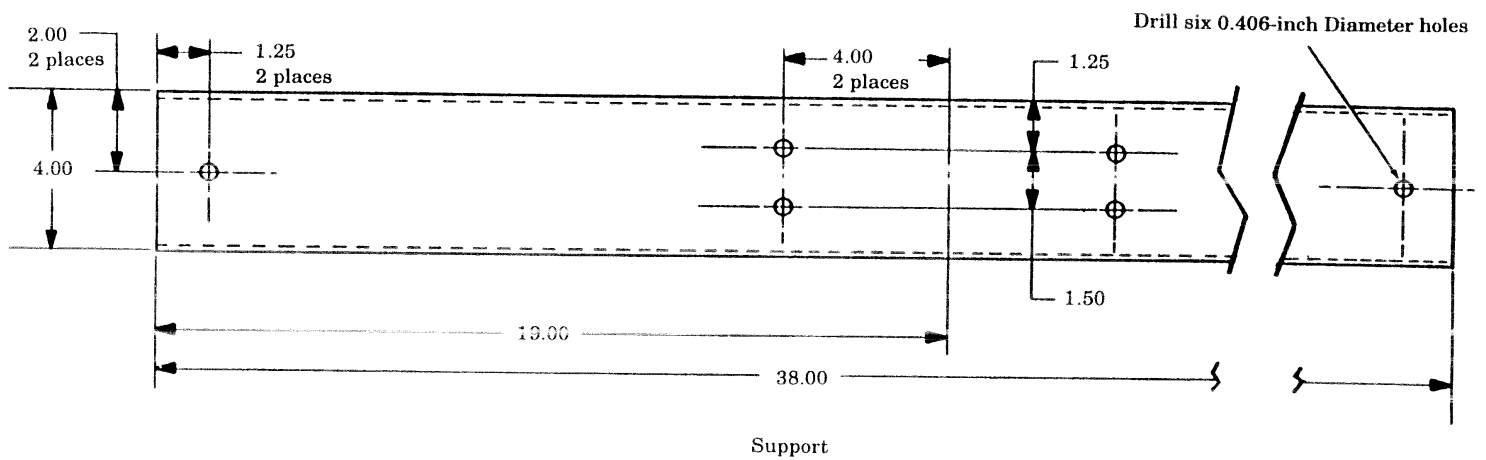
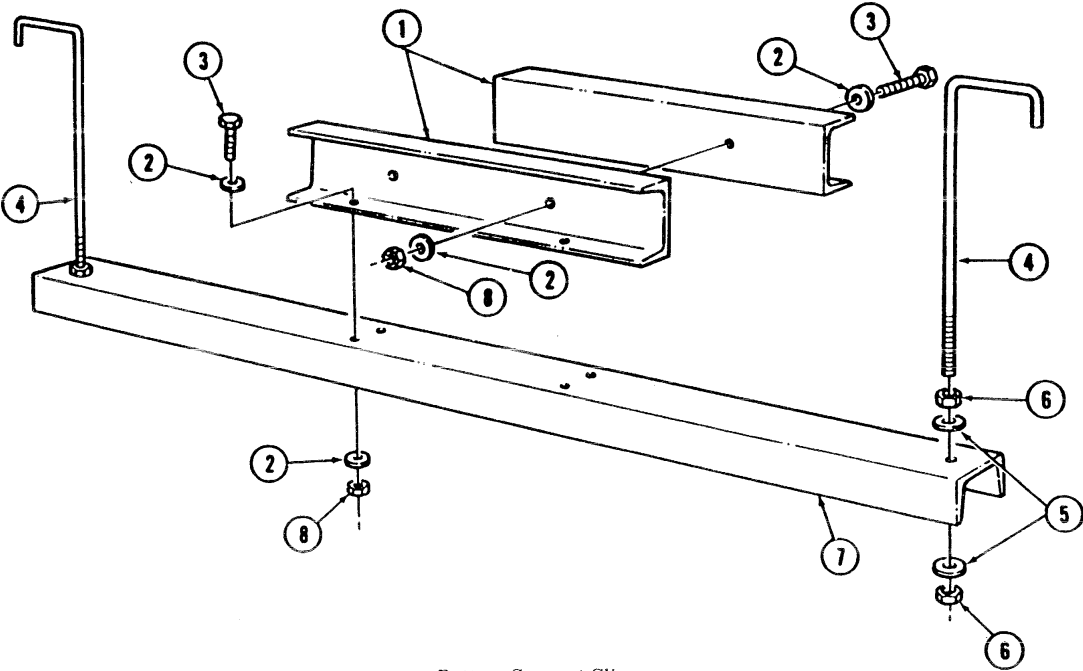
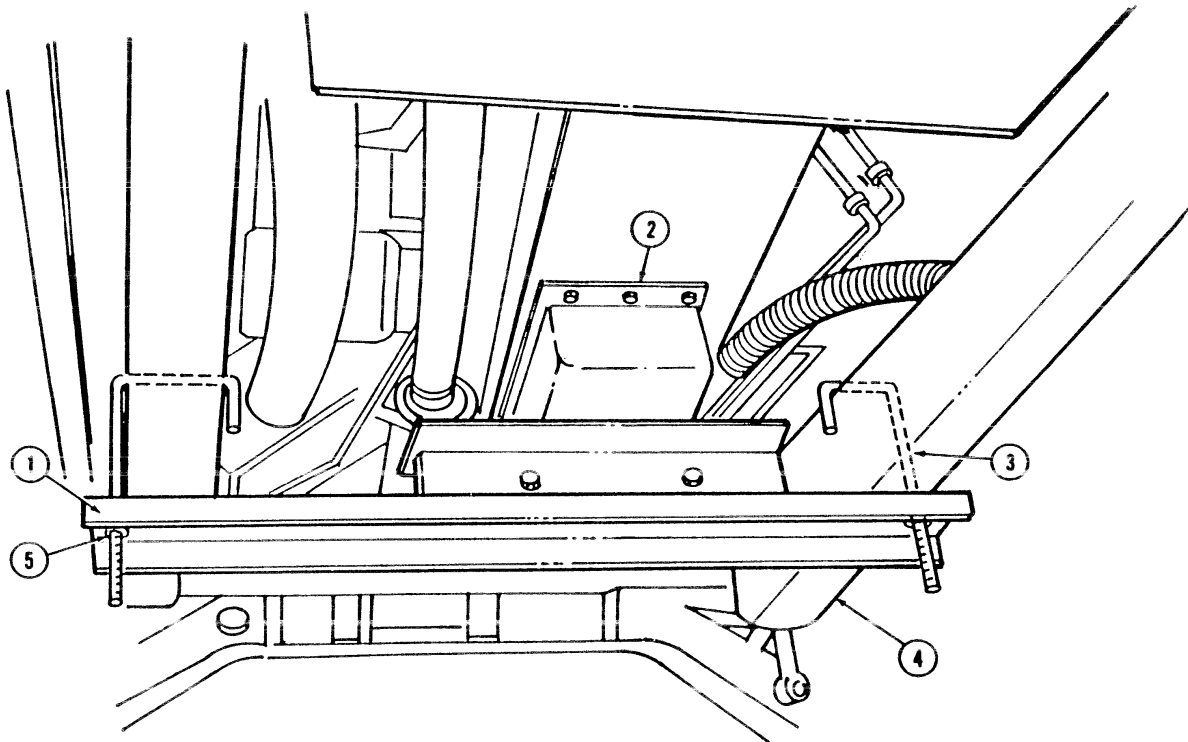


FIGURE 3-60



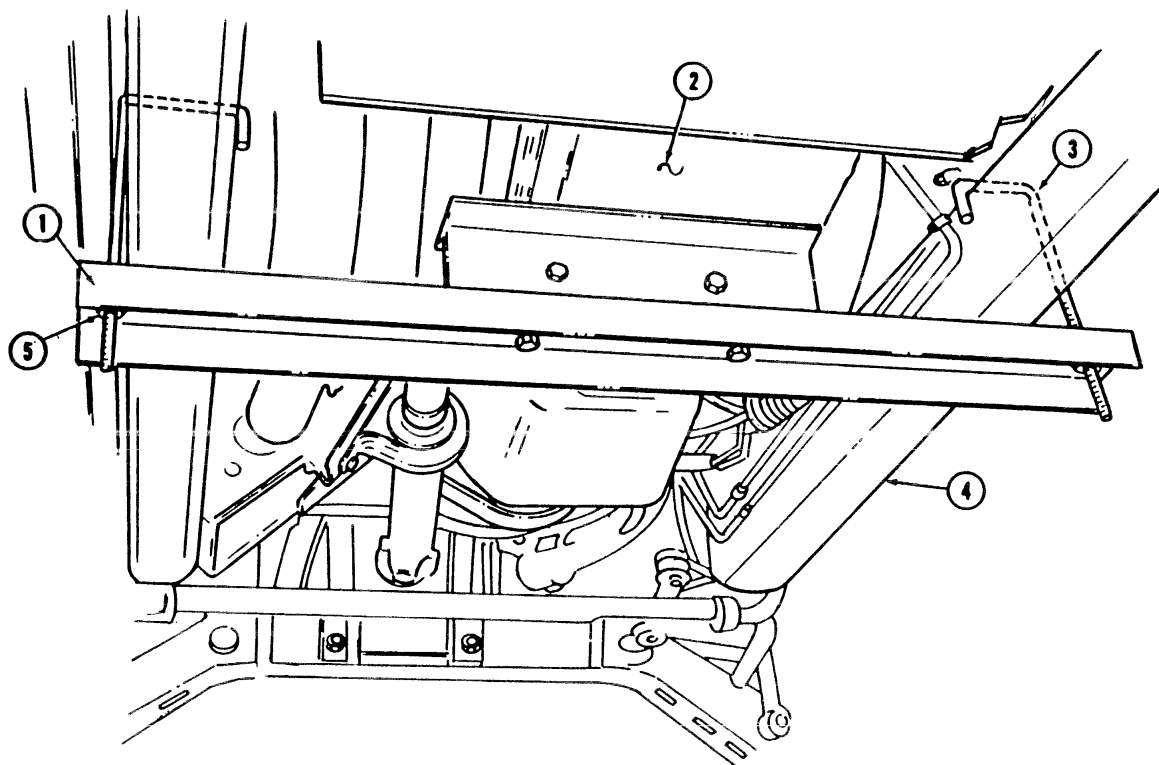
Bottom Support Sling

FIGURE 3-61



Supporting Engine

FIGURE 3-62



Supporting Transmission

FIGURE 3-63

NOTES:

- (1) All dimensions are in inches.
- (2) Material: Steel, Carbon, Flatbar
1018, Cold Finished,
IAW Spec. ASTM A108
0.125 thick
- (3) Remove all burrs and sharp edges.

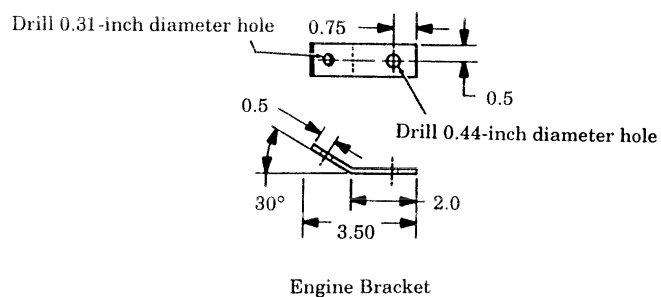


FIGURE 3-64

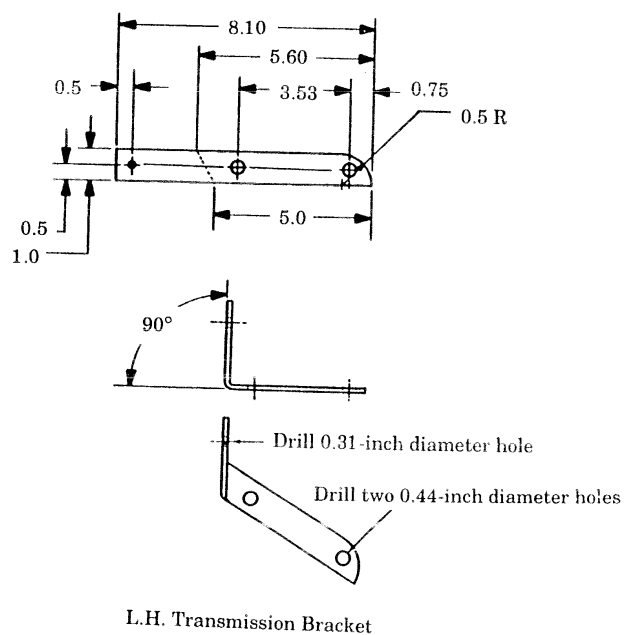


FIGURE 3-65

NOTES:

- (1) All dimensions are in inches.
- (2) Material: Steel, Carbon, Flatbar
1018, Cold Finished,
IAW Spec. ASTM A108
0.125 thick
- (3) Remove all burrs and sharp edges.

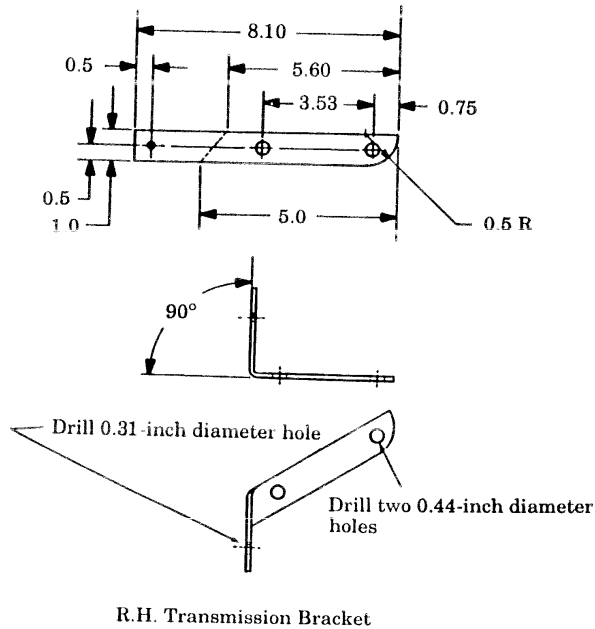


FIGURE 3-66

NOTES:

- (1) All dimensions are in inches.
- (2) Material: Steel, Angle, Structural
Grade 1020, Hot Rolled,
IAW Spec. ASTM A575
0.155 thick
- (3) Remove all burrs and sharp edges.

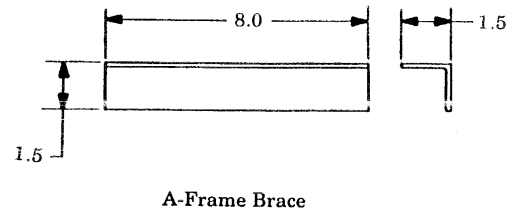


FIGURE 3-67

- NOTES:
- (1) All dimensions are in inches.
 - (2) Material: Steel, Angle, Structural
Extruded, IAW Spec. ASTM A36
0.125 thick
 - (3) Remove all burrs and sharp edges.

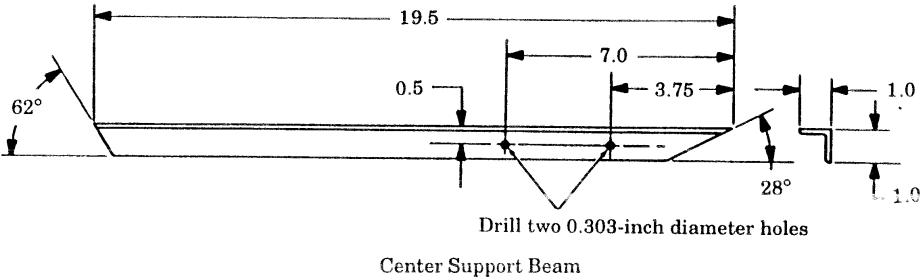


FIGURE 3-68

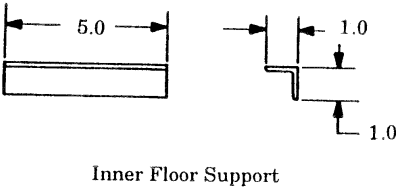


FIGURE 3-69

NOTES:

- (1) All dimensions are in inches.
- (2) Material: Steel, Angle, Structural
Extruded, IAW Spec. ASTM A36
0.125 thick
- (3) Remove all burrs and sharp edges

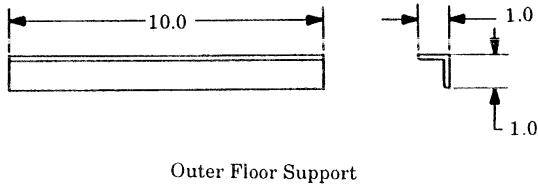


FIGURE 3-70

NOTES:

- (1) All dimensions are in inches.
- (2) Material: Steel, Chain, Welded, C22
Close Link, IAW Spec. RR-C-271 Type 1
Class 4, 0.250 diameter

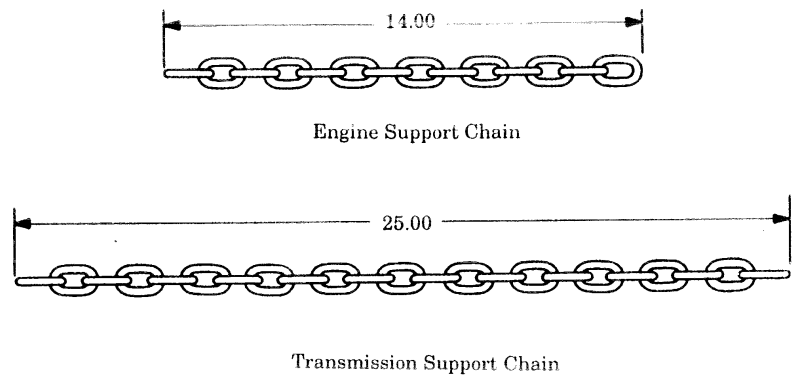
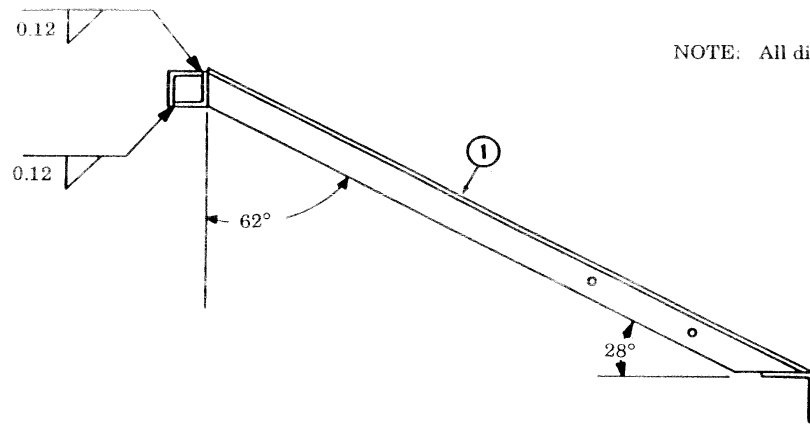


FIGURE 3-71



NOTE: All dimensions are in inches.

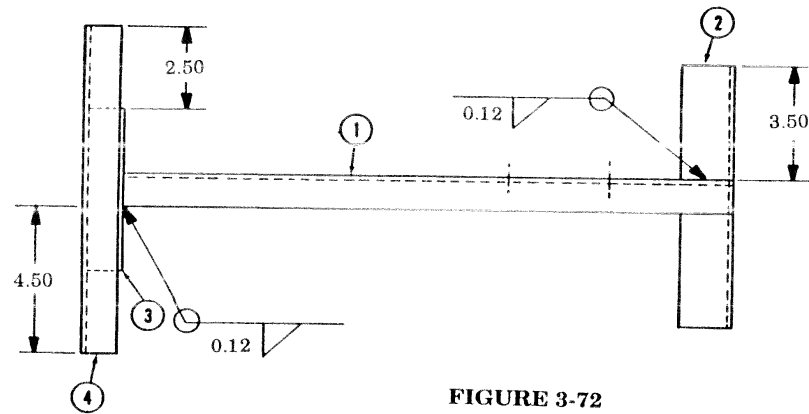
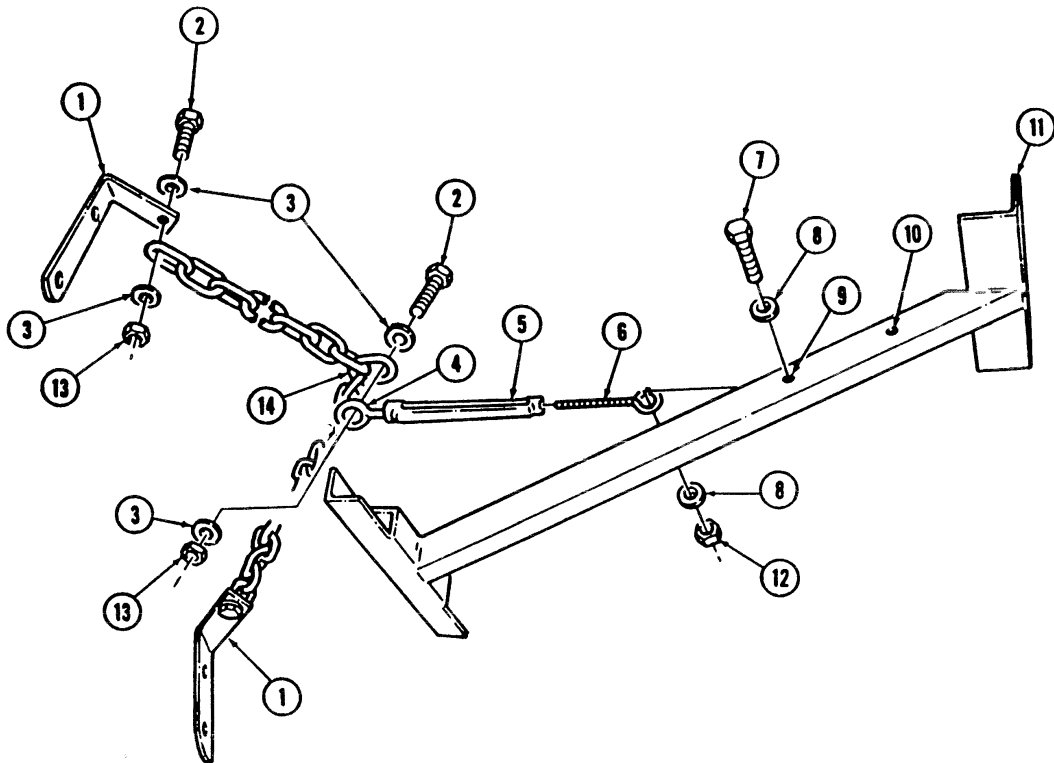
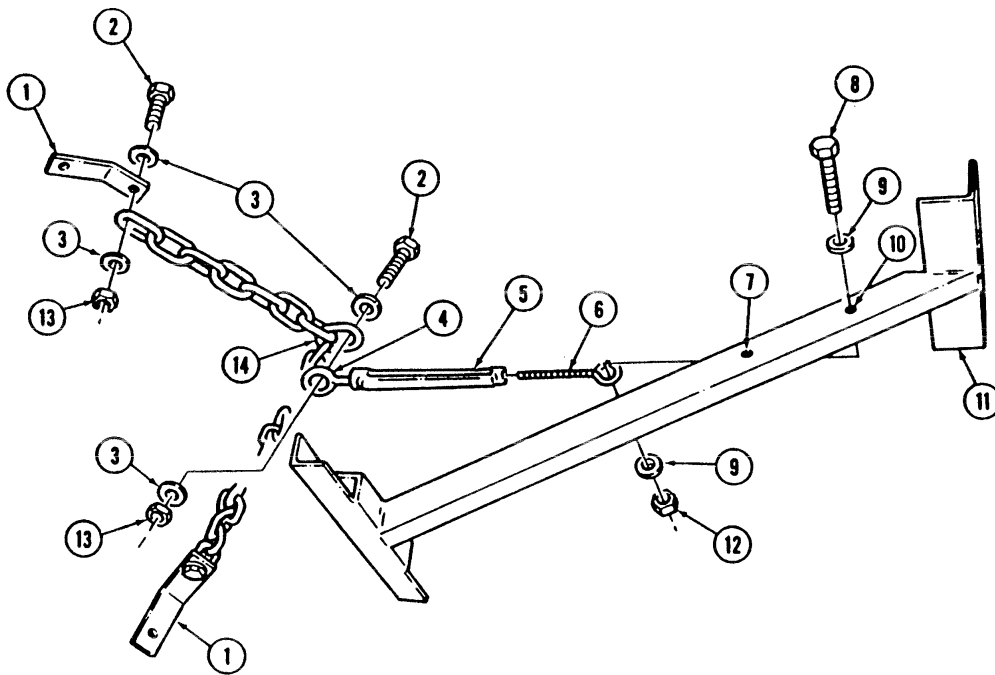


FIGURE 3-72



Assembly for transmission use

FIGURE 3-73



Assembly for engine use

FIGURE 3-74

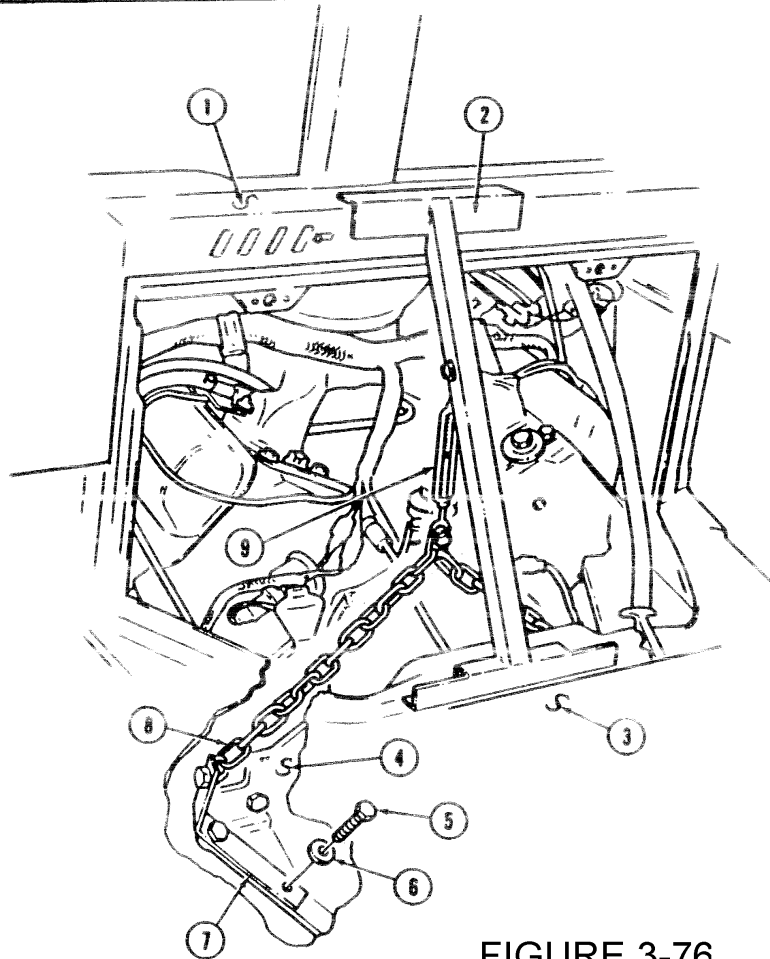


FIGURE 3-76

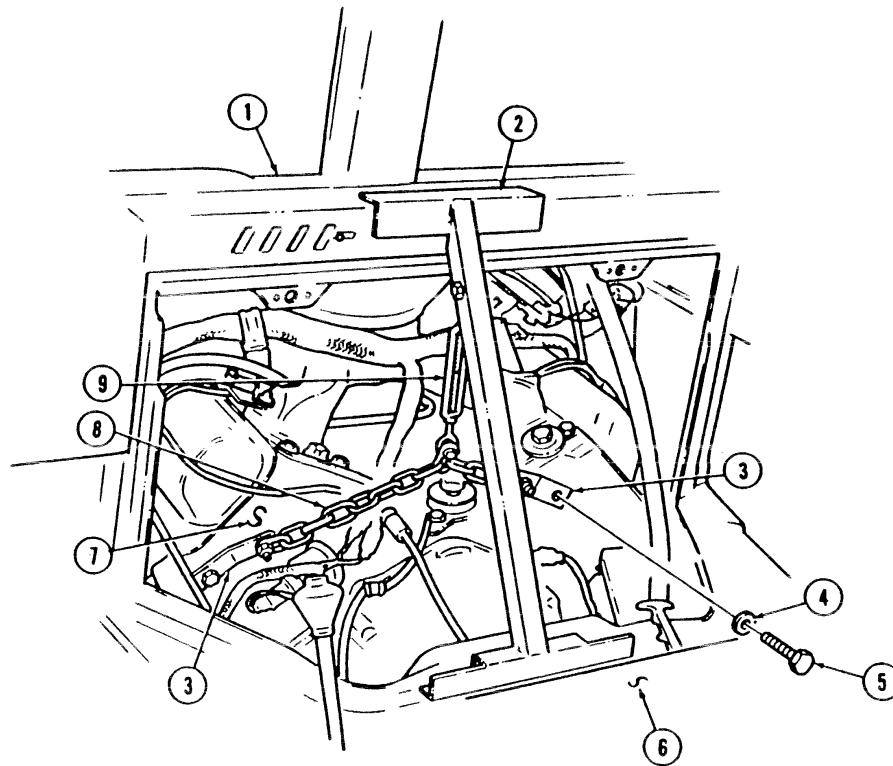


FIGURE 3-76

8-8. Misc. Vehicles

MODEL:

All TACOM Managed Vehicles

SUBJECT:

Color Highlighting of Fluid Level Gage Rods (Dipsticks)

POC:

Mr. Daniel Dudek, AMSTA-MTA, DSN 786-7416, Commercial (810) 574-7416

DEFICIENCY:

Dipstick handles painted to match engines sometime make it difficult to locate them. Painting the dipsticks handles yellow makes them easier to locate and lessens the chance of them being missed during routine PMCS.

COMMENTS:

An adopted suggestion has resulted in the following instruction for painting dipstick handles similar to what's being done in the commercial automotive industry. Implementation of the following is left to the discretion of the local commander.

PROCEDURES:

WARNING

Cover dipstick openings while dipstick is being cleaned and painted to prevent dirt or debris from entering fluid reservoir and causing damage to equipment.

NOTE

The following are generic procedures for painting dipstick handles. Minor variations may be required to accommodate your specific situation.

- A.** Remove dipstick from dipstick tube and cover opening.
- B.** Using soap and water clean all grease, oil, and dirt from dipstick and handle. Dry the dipstick assembly using compressed air. Ensure dipstick and handle are clean and dry before proceeding to next step.
- C.** Using clean rags or adhesive tape, cover the gage portion and any seals used on the gage portion of the dipstick.

8-8 Misc. Vehicles cont.

D. Using NSN 8010-00-721-9744, paint the handle end of the dipstick following the instructions from the paint can label, allowing the paint sufficient time to dry before reinstalling the dipstick.

E. Repeat the above for each fluid reservoir dipstick for the vehicle.

PUBLICATIONS AFFECTED:

TB 43-0209 31 Oct 90

LEVEL OF MAINTENANCE:

Crew/Unit

8-2. Miscellaneous

SUBJECT:

Feasibility study for improving MIL-A-46153 antifreeze

POC:

Mr. Gary Mitchell, AMSTA-IM-MTA, DSN 786-6950, Commercial (810) 574-6950
mitchelg@cc.tacom.army.mil

DEFICIENCY:

The present MIL-A-46153 antifreeze formulation contains no "aluminum specific" anti-corrosion inhibitors. When the MIL-A-46153 formulation was developed in the 1950's, heavy-duty engines were constructed of cast iron, with brass/copper radiators. Today, heavy-duty engine manufacturers are using aluminum alloys to reduce engine weight and increase overall efficiency. Aluminum alloys can be found in radiators, cylinder heads, water pump housings, manifolds, and engine blocks.

COMMENTS:

A. The Fuels & Lubricants Division of TACOM RD&E Center evaluated the performance of MIL-A-46153 and found it to be satisfactory. However, they felt that it could be improved to provide better corrosion protection for aluminum components. They initiated a study, which involved developing and testing 14 different antifreeze formulations. Of the 14 experimental formulations, 3 showed a significant improvement over the current MIL-A-46153 formulation. However, because of funding constraints and loss of technology base resources, this effort could not be completed.

8-2. Miscellaneous cont.

B. In FY93, the Defense General Supply Center (DGSC) initiated a parallel effort to develop a less toxic alternative antifreeze. Current MIL-A-46153 antifreeze uses ethylene glycol (EG) as its base material and has a relatively high toxicity. Propylene glycol (PG) was chosen as a less toxic base material. Because of PG's similar chemical characteristics compared to EG, the research and development accomplished during the program to improve MIL-A-46153 will be directly applied to the PG antifreeze effort.

CONCLUSIONS: Even though the effort to improve MIL-A-46153 antifreeze aluminum corrosion inhibitor characteristics has ended, the technology that was developed will be transitioned directly to the less toxic PG antifreeze development. No target date has been established when a new MIL-Spec "aluminum specific," less toxic antifreeze will be released for tactical and combat vehicle use. We will keep you informed of the progress.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

All

8-4. Misc. Vehicles

MODEL:

All tactical vehicles

SUBJECT:

Low Sulfur Diesel and JP-8 Fuels

POC:

Mr. Steve Weisenhaus, AMSTA-IM-MTA, DSN 786-6950, Commercial (810) 574-6950
weisenhs@cc.tacom.army.mil

COMMENTS:

The following is provided for field information only:

1. Low Sulfur Diesel Fuel (LSDF) was mandated nationwide in October 1993 for all on-highway vehicles. This is part of the Clean Air Acts Amendment (CAAA) and is enforced by the Environmental Protection Agency (EPA). LSDF contains less than 0.05% sulfur by weight and meets other environmental requirements (such as reduced aromatic content) for highway use. Soon after the mandate, there were reports of fuel-related problems such as leaking O-rings in fuel system components and premature wear of rotary-type fuel lubricated fuel injector pumps.
2. Army vehicles are especially vulnerable to this problem for the following reasons:

- a. Severe operational requirements are placed on Army vehicles, such as long periods of non-use followed by short periods of intense use and operation in hostile areas, including extremes in temperature, humidity, dust, and terrain.
- b. The military stores fuel for long periods, especially in vehicle fuel tanks. This allows a winter grade fuel purchased in the late fall to be used during the spring and summer, and vice-versa. Winter grade fuels have a lower density and viscosity than regular grade diesel fuel. The winter grade fuels are also more volatile so that they can be used in extremely low temperatures. Moreover, the long storage can promote fuel deterioration due to auto-oxidation and possible microbiological growth.
- C. The Army has a high density of diesel engines with fuel-wetted components that are wear sensitive such as the Stanadyne rotary injection fuel pump. The reduced lubricity of LSDF can lead to increased wear on these components.

8-4. Misc. Vehs. cont.

- 3. The changes in fuel refining, fuel processing, and distribution required to meet the new CAAA requirements also raise the question of how other fuel properties might be affected. Fuel properties include cloud point, freeze point, pour point, stability, and cleanliness. All diesel fuel purchased by the Defense Fuel Supply Center (DFSC) as motor vehicle fuel for military use is purchased under the Post-Camp-Station (PCS) procurement system. The fuel is purchased against VV-F-800D, however, this specification does not currently include all of the changes in fuel quality resulting from the mandate to LSDF. The Army is revising VV-F-800D to include these changes.
- 4. The Army selected diesel fuel samples from thirty-eight fuel delivery trucks at selected military installations. Each sample was tested for lubricity and other properties. By analyzing fuel samples we can better judge the need for changes to VV-F-800D and the need for interim fixes to any fuel-related problems. Fuel samples will continue to be measured for lubricity. If lubricity continues to be a problem, we will look into using additives to those fuels having low lubricity.

NOTE

If you are having any fuel-related problems, report them to the Belvoir Mobility Tech Center at DSN 654-1819/1817 or Commercial (703) 704-1817.

- 5. The Army has adopted a strategy to use a single fuel for the battlefield, i.e., one fuel that can be used for both aircraft and ground vehicles/equipment. Under the single fuel concept, the Army has been using JP-8 at selected locations. When the CAAA went into effect, the Army had to limit its use of JP-8 to those locations where refiners would "guarantee" supplying a low-sulfur

JP-8; i.e., less than 0.05 sulfur, as the JP-8 specification allows up to 0.30% sulfur. The Army subsequently conducted tests on JP-8 because they believed it would produce lower diesel exhaust emissions than expected. The results showed that JP-8 has essentially the same emissions as the LSDF that meets CAAA requirements. Based upon these results DOD has formally requested that the EPA grant an exception for using JP-8 on an unrestricted basis. Hopefully, this will open the door for Army use of JP-8 as a universal ground fuel.

PUBLICATIONS AFFECTED:

All -10 and -20 level publications

LEVEL OF MAINTENANCE:

All

8-3. Misc. Vehicles

MODEL:

All TACOM-Managed Diesel Engine Powered Ground Vehicles and Equipment

SUBJECT:

Lubricating Oil Update

POC:

Mr. Steve Weisenhaus, AMSTA-IM-MTA, DSN 786-6950, Commercial (810) 574-6950
weisenhs@cc.tacom.army.mil

COMMENTS:

The following is provided for field information only:

A. MILITARY SPECIFICATION (MIL-L-2104) OILS:

1. The military specification governing lubricating oils is MIL-L-2104, Lubricating Oil, Internal Combustion Engine, Combat/Tactical Service. The specification covers viscosity grades 10, 30, 40 and multi-viscosity 15W40 weight oils. In Apr 83, MIL-L-2104 was revised. In the revision, 50 weight oil was deleted and multi-viscosity 15W40 was added. OE/HDO-15/40 is the military symbol for the SAE 15W40 Grade under MIL-L-2104. 15W40 is packaged in either a 1 quart, 5 gallon, or 55 gallon container, each with a different NSN.

8-3. Misc. Vehs. cont.

2. These oils (MIL-L-2104) can be used in internal combustion engines, power steering units, hydraulic systems, transmissions, and gearbox units. However, you should check the applicable vehicle/equipment lubrication order if you are unsure about proper grade or type of lubrication.
3. With certain exceptions, which are detailed in paragraph 5, 15W40 oils can be used in place of 10, 30 and 40 weight oils where ambient temperatures are expected to exceed 5 degrees Fahrenheit (- 15 degrees Celsius). When used, 15W40 oils must not be mixed with single grade lubricating oils. This ensures the lubrication and protective properties will not be diluted. Complete oil change is required when converting to 15W40 oil. Arctic grade oil (OEA) is still required in areas where expected ambient temperature is lower than 5 degrees Fahrenheit.
4. Straight weight oils such as 10, 30, and 40 weight oils are still valid for individual applications and may be used where appropriate. Changing from straight weight oils to 15W40 is not required, however, under certain climatic conditions use of 15W40 may reduce or eliminate the need for seasonal oil changes.
5. Multiviscosity 15W40 oil should not be used in the following vehicle components or situations:
 - a. Abrams Tank - X1100 Transmission
 - b. JD 410 Loader Backhoe Transmission
 - c. Equipment covered by a manufacturer's warranty specifying other lubricating oils.
 - d. Hydraulic systems requiring use of MIL-H-6083 or MIL-H-46170 Hydraulic Fluids.
 - e. The M88 Improved Recovery Vehicle (IRV) transmission.
6. Since straight weight oils should not be mixed with multi-viscosity oils, we recommend that those vehicle components with multi-grade oil be identified. The following are suggested methods for identifying vehicles using multi-viscosity oils:
 - a. Use red wire tag, NSN 8135-00-952-0672, and mark the tag with a statement such as "use 15W40 oil only" and secure the tag in the oil dipstick.
 - b. Use the Equipment Identification Card, record a statement such as "use 15W40 oil only" between the NSN AOAP sample lines.
 - c. Use DD Form 1970 Motor Equipment Utilization, and record in the oil block a statement such as "use 15W40 oil only."

8-3. Misc. Vehs. cont.

- d. In the remarks block of DD Form 314, Preventive Maintenance Schedule, record a statement such as "Change oil with 15W40."
- e. In the remarks block of DA Form 2408-20, oil analysis log, record a statement such as "oil changed with 15W40."

B. COMMERCIAL HEAVY DUTY OIL (CHDO):

- 1. CHDO is authorized as an alternative to MIL-L-2104 for use in all tactical wheeled vehicle engines only. Combat (tracked) vehicle applications, all tactical (wheeled) vehicle non-engine applications, and special purpose equipment (such as material handling, construction, construction support, trailer/tanker pony auxiliary engine) applications are not authorized to use the CHDO. Users should continue to use lubricants identified in the appropriate lubrication orders for all equipment, except for the use of CHDO in tactical wheeled vehicle engines.
- 2. We encourage maintenance managers and supply personnel to order CHDO products over MIL-L-2104 whenever possible. CHDO costs less than MIL-L-2104 and is delivered directly from the vendor in CONUS. When you order in pallet sized quantities, you should receive your shipment in less than 15 days. Direct vendor delivery is not available for OCONUS customers. All OCONUS requirements will be filled from depot stocks.
- 3. The following is a complete list of authorized available CHDO products:

<u>GRADE</u>	<u>UNIT OF ISSUE</u>	<u>NSN</u>	<u>PALLET LOAD</u>
15W40	BX (12 1 QT)	9150-01-351-9019	Not Available
15W40	CO (5 GAL)	9150-01-352-2962	36 CO
15W40	DR (55 GAL)	9150-01-351-9018	4 DR
3OW	BX (12 1 QT)	9150-01-351-9016	80 BX
3OW	CO (5 GAL)	9150-01-352-8090	36 CO
3OW	DR (55 GAL)	9150-01-351-9015	4 DR
4OW	DR (55 GAL)	9150-01-352-8091	4 DR

PUBLICATIONS AFFECTED:

All tactical vehicle lubrication orders will be updated to include both CHDO and MIL-L-2104 oil during their next scheduled change/revision.

LEVEL OF MAINTENANCE:

Operator and Unit

8-2. Tactical Trucks

MODEL:

HMMWV M998A2 Series

SUBJECT:

TM Update

POC:

Ms. Patricia Grashik, AMSTA-IM-HLA, DSN 786-5225,
Commercial (810) 574-5225
grashikp@cc.tacom.army.mil

COMMENTS:

The M998A2 series vehicles will be fielded soon. To keep pace with vehicle changes, updated TMs will be issued to the field units. The revised manuals include all approved DA Form 2028-2 recommended changes from field units, PS Magazine articles, EIR Digest articles, and vehicle enhancements. Vehicle enhancements resulting in changes to the TMs are: 6.5L engine, 4L80E (electronic transmission), muffler and catalytic converter, serpentine drive belt, dual voltage regulator, self-canceling turn signal*, 9,000 lb winch*, wheel and tire assembly (new runflat), front bumper, and related parts not listed in this TB. We changed the format of TM9-2320-280-34. Direct Support procedures are grouped together in the beginning of the TM with General Support tasks following. Before using revised manuals, review your table of contents for new location of tasks, and ensure the applicable model and/or part number matches your vehicle. The following list is a description of changes, TMs affected, and the referenced EIR Digest or PS Magazine issues where the changes or updates were initially published.

*SEE FCG 3307 for HMMWV basic, heavy, and A1 upgrade kits.

8-2. Tact. Trucks cont.

<u>FUNCTIONAL GROUP CODE</u>	<u>DESCRIPTION OF CHANGE</u>	<u>TM AFFECTED</u>	<u>OTHER PUBLICATIONS</u>
BII	First-Aid Kit Relocated	9-2320-280-10, Para. 2-2	
AAL	Padlock Set Added	9-2320-280-10, Appendix C	
AAL	Fire Extinguisher Bracket Deleted	9-2320-280-10, Appendix C	
0100	Engine Mount Starter Bracket	9-2320-280-34, Para. 3-3	
0100/0710	Engine/Transmission Support Sling Fabrication	9-2320-280-34, Paras. 3-22, 3-24, Appendix C	TB 43-0001-39-6, Sep 93
0106	CDR Caution	9-2320-280-20-1, Table 2-1 (PMCS)	
0106	Optional Oil Pan Gasket and Washers	9-2320-280-20-2, Para. 3-6; 9-2815-237-34, Para. 2-14	TB 43-0001-39-7, Dec 93
0302	Fuel Injection Bleeding	9-2320-280-34, Para. 4-4	
0302	Kick-Down Switch Replacement Moved from Chapter 5	9-2320-280-20-2, Para. 4-43	
0302	Wire Numbers 569B/569D Added	9-2320-280-20-1, Para. 2-22	
0303	200-Amp Alternator Note for Radiator Inlet Hose	9-2320-280-20-2, Paras. 3-61, 3-69	TB 43-0001-39-6, Sep 93

B-2. Tact. Trucks cont.

<u>FUNCTIONAL GROUPCODE</u>	<u>DESCRIPTION OFCHANGE</u>	<u>TM AFFECTED</u>	<u>OTHER PUBLICATIONS</u>
0304	Air Filter Cleaning	9-2320-280-20-2, Para. 3-13	
0311	Glow Plug Foldout	9-2320-280-20-3, Appendix F	
0311	Glow Plug Warnings Changed	9-2320-280-10, Para. 2-10	
0401	Exhaust System PMCS Check	9-2320-280-10, Table 2-2 (PMCS)	
0501	Surge Tank Replacement	9-2320-280-20-2, Paras. 3-64, 3-73	
0505	Fan Clutch Dust Seal	9-2815-237-34, Para. 2-40	TB 43-0001-39-6, Sep 93
0505	Sleeves Repair for 6.2L Block	9-2815-237-34, Para. 2-16	TB 43-0001-39-8, Mar 94
0605	Fan Clutch Compressed Air Note	9-2320-280-20-1, Para. 2-25; 9-2320-280-20-2, Para. 3-78	TB 43-0001-39-2, Sep 94
0506	Fan Drive Friction Lining Replacement	9-2320-280-20-2, Par&. 3-79	TB 43-0001-39-7, Dec 93
0601	Drive Belt Flutter	9-2320-280-10, Table 2-2 (PMCS)	
0603	Starter Repair Torque	9-2320-280-34, Para. 6-6	

8-2. Tact. Trucks cont.

<u>FUNCTIONAL GROUP CODE</u>	<u>DESCRIPTION OF CHANGE</u>	<u>TM AFFECTED</u>	<u>OTHER PUBLICATIONS</u>
0607	Brake Warning Lamp Stays ON Troubleshooting	9-2320-280-20-1, Para. 2-32	TB 43-0001-39-1, May 94
0607	Fuel Gauge Troubleshooting	9-2320-280-20-1, Para. 2-32	
0607	Instrument Test	9-2320-280-20-1, Para. 2-32	
0608	Directional Signal Switch Cleaning	9-2320-280-20-2, Para. 4-64	PS Magazine, Dec 93
0608	Fabricate Power-On Test Module for Troubleshooting	9-2320-280-20-1, Para. 2-28; 9-2320-280-20-3, Appendix D	TB 43-0001-39-5, Jun 93
0608	PCB Wiring Diagram	9-2320-280-20-3, Appendix F	
0608	Time Delay Module Troubleshooting Note	9-2320-280-20-1, Para. 2-25	PS Magazine, Jul 93
0608	Add Sealing Compound to Stoplight Switch	9-2320-280-20-2, Para. 4-60	
0612	Slave Receptacle Cable Caution	9-2320-280-10, Para. 2-23	
0613	Battery Test Troubleshooting	9-2320-280-20-1, Para. 2-30	
0613	Drain Holes Drilled in Battery Tray	9-2320-280-20-2, Para. 4-80	TB 43-0001-39-6, Sep 93

8-2. Tact. Trucks cont.

<u>FUNCTIONAL GROUP CODE</u>	<u>DESCRIPTION OF CHANGE</u>	<u>TM AFFECTED</u>	<u>OTHER PUBLICATIONS</u>
0705	Neutral Start Switch Torque	9-2320-280-20-2, Para. 6-6	
0705	Transmission Modulator Assembly Moved to Unit Level	9-2320-280-20-2, Paras. 5-14, 5-15	TB 43-0001-39-2, Sep 94
0706	Transmission Service Torque	9-2320-280-20-2, Para. 5-2	
0713	Transmission Repair	9-2320-280-34, Para. 17-10	
0713	Transmission Road Test Moved to Unit Level	9-2320-280-20-2, Para. 5-21	TB 43-0001-39-2, Sep 94
0801	Transfer Case Yokes Moved to Unit Level	9-2320-280-20-2, Para. 5-26	TB 43-0001-39-4, Mar 93
0801	Transfer Case Caution	9-2320-280-20-1, Table 2-1 (PMCS)	
0801	Transfer Case Oil Capacity	9-2320-280-10, Table 1-2; 9-2320-280-20-1, Table 1-2	
0900	Front Propeller Shaft U-Bolt and Adapter Tool (M1O97, A1 and A2 Models)	9-2320-280-20-1, Table 2-1 (PMCS); 9-2320-280-20-2, Para. 6-2; 9-2320-280-20-3, Appendix E	TB 43-0001-39-3, Dec 94
1002/1102	Differential Axle Free Play	9-2320-280-34, Para. 9-11	TB 43-0001-39-5, Apr 91

8-2. Tact. Trucks cont.

<u>FUNCTIONAL GROUP CODE</u>	<u>DESCRIPTION OF CHANGE</u>	<u>TM AFFECTED</u>	<u>OTHER PUBLICATIONS</u>
100211102	Differential Washer Seals	9-2320-280-34, Para. 9-5	
1002/1102	Delete Geared Hub in Caution	9-2320-280-20-1, Table 2-1 (PMCS)	
1004/1104	Lower Ball Joint Torques	9-2320-280-20-2, Para. 6-27	
1201	Brake Lever Lock Chain Fabrication	9-2320-280-10, Para. 2-12; 9-2320-280-20-3, Appendix D	TB 43-0001-39-4, Mar 93
1201	Parking Brake Cable Bracket	9-2320-280-20-2, Paras. 7-23, 7-24	TB 43-0001-39-6, Sep 93
1201	Brake Pad Replacement Note	9-2320-280-20-2, Para. 7-11	
1201	Parking Brake Cable Chafing Note	9-2320-280-20-1, Table 2-1 (PMCS); 9-2320-280-20-2, Paras. 7-23, 7-24	TB 43-0001-39-6, Sep 93
1201	Parking Brake Arctic Conditions Note	9-2320-280-10, Para. 2-31	
1204	Proportioning Valve NSN	9-2320-280-20-2, Para. 7-18; 9-2320-280-20-3, Appendix C	PS Magazine, Mar 93
1301	Radial Tire Direction Note	9-2320-280-20-2, Paras. 8-5,8-5.1	

8-2. Tact. Trucks cont.

<u>FUNCTIONAL GROUP CODE</u>	<u>DESCRIPTION OF CHANGE</u>	<u>TM AFFECTED</u>	<u>OTHER PUBLICATIONS</u>
1311	Wheel and Tire Replacement	9-2320-280-20-3, MAC Chart	
1311	Wheel Stud Replacement	9-2320-280-20-2, Para. 8-8	
1311	Wheels and Tire Spacer Note	9-2320-280-20-2, Para. 8-5	
1311	Tire Flat Spot and Warm Tire Troubleshooting Notes	9-2320-280-20-1, Para. 2-37	
1401	Steering Column Rigidity Brackets	9-2320-280-20-2, Para. 8-19	TB 43-0001-39-1, May 94
1401	Steering Shaft U-Joint Repair	9-2320-280-20-2, Para. 8-22	TB 43-0001-39-8, Mar 94
1401	Toe-In Adjustment Notes	9-2320-280-20-2, Para. 8-10	
1401	Tie Rod Clamp Rotated 90' in Art	9-2320-280-20-2, Para. 8-10	
1801	Bulkhead Door Retainer Fabrication	9-2320-280-20-3, Para.11-155, Appendix D	TB 43-0001-39-2, Sep 94
1801	Splash Shield Access Cover Replacement	9-2320-280-20-3, Para. 10-18, Appendix D	TB 43-0001-39-5, Jun 93
1808	Water Can Art Reversed	9-2320-280-20-3, Para. 11-108	TB 43-0001-39-3, Dec 94

B-2. Tact. Trucks cont.

<u>FUNCTIONAL GROUP CODE</u>	<u>DESCRIPTION OF CHANGE</u>	<u>TM AFFECTED</u>	<u>OTHER PUBLICATIONS</u>
1810	Tailgate Chain Cover and Reinforcement Bracket	9-2320-280-20-1, Table 2-1 (PMCS); 9-2320-280-20-3, Para. 10-60	
1810	Tailgate Lowering Note	9-2320-280-10, Para. 2-21	
1812	Cargo Door Gas Springs Rotation	9-2320-280-20-3, Para. 11-21	TB 43-0001-39-3, Dec 94
1812	Turret Bearing and Armament Seals	9-2320-280-20-3, Paras. 11-51,11-61	TB 43-0001-39-7, Dec 93
1812	Turret Handle Replacement	9-2320-280-20-3, Para. 11-55, Appendix D	TB 43-0001-39-7, Dec93
1812	Weapon Station Turret Adjustment, Cleaning, and Seal Replacement	9-2320-280-20-3, Para. 11-113	TB 43-0001-39-7, Dec 93
2001	Winch Thimble Fabrication	9-2320-280-20-3, Para. 10-110; 9-2320-280-34, Appendix C	PS Magazine, Jul 93
2201	C-Pillar Reinforcement Bracket	9-2320-280-20-3, Para. 10-105, Appendix D	TB 43-0001-39-3, Dec 93
2201	Soft Door Window and Leak Repair	9-2320-280-20-3, Para. 10-104	TB 43-0001-39-7, Dec 93
2201	Soft Top Zippers PMCS Check	9-2320-280-10, Table 2-2 (PMCS)	

8-2. Tact. Trucks cont.

FUNCTIONAL GROUPCODE	DESCRIPTION OF CHANGE	TM AFFECTED	OTHER PUBLICATIONS
2202	Direction Note for Windshield Washer Hose Clamp Added	9-2320-280-20-3, Para. 10-76	TB 43-0001-39-6, Sep 93
2202	Ambulance Body Repair	9-2320-280-34, Para. 22-8, Appendix C	TB 43-0001-39-1, May 94
2202	Mirror Blind Hole Puller Set Note	9-2320-280-20-3, Appendix B	
2202	Spreader Bar Replacement	9-2320-280-20-3, Para. 11-215	
2202	Wiper Arm Spring Replacement	9-2320-280-20-3, Para. 10-70	TB 43-0001-39-5, Sep 93
2202	Wiper Pivot Arm Temporary Repair	9-2320-280-20-3, Para. 10-74	TB 43-0001-39-5, Jun 93
2604	Tool Kits Added	9-2320-280-20-3, MAC Chart	
3307	Mud Flap Installation	9-2320-280-20-3, Para. 10-63, Appendix D	TB 43-0001-39-4, Mar 93
3307	Fan Drive Hose Quick-Disconnect	9-2320-280-20-2, Replacement Para. 3-68; 9-2320-280-20-3, Appendix D	TB 43-0001-39-2, Dec 94

8-2. Tact. Trucks cont.

<u>FUNCTIONAL GROUP CODE</u>	<u>DESCRIPTION OF CHANGE</u>	<u>TM AFFECTED</u>	<u>OTHER PUBLICATIONS</u>
3307	9,000 lb Winch Kit, 57K3217, 2590-01-418-2135 (AVY, A11, A13, A14, A15, A20, A24, A25, A26, A27, B 16, B 17, B18, HVY, H11, H13, H14, H15, H16, H17, H18, H20,H21, H24, H25, H26, H27, H28)	9-2320-280-20-3, Paras. 10-108, 10-112	
3307	100-Amp Niehoff Alternator Testing and Repair	9-2320-280-34, Para. 16-15	TB 43-0001-39-6, Sep 93
3307	Cargo Barrier and Net Kit, 57KO293, 2510-01-K64-6462 (H17, H18, B17, B18)	9-2320-280-20-3, Paras. 11-110, 11-111	
3307	60/100-Amp Alternator Bracket Kit, 57KO294, 2590-01-423-1975 (A11, A13, A14, A20, A24, A25, A26, A27, B16, B17, B18, H11, H13, H14, H16, H17, H18, H20, H21, H24, H25, H26, H27, H28)	9-2320-280-20-2, Para. 4-2; 9-2320-280-20-3, Paras. 12-23, 12-24; 9-2320-280-34, Para. 3-26	
3307	200-Amp Alternator Bracket Kit, 57KO295 (A15, AVY, H15, HVY)	9-2320-280-20-2, Para.4-110; 9-2320-280-34, Paras. 3-22, 3-23	
3307	Rearview Mirror Kit (LH Lowered), 57K3214, 2540-01-424-7363 (AVY, A11, A13, A14, A15, A20, A24, A25, A26, A27, B16,B17, B18, HVY, H11, H13, H14, H15,H16,H17, H18, H20, H2I, H24, H25, H26,H27, H28)	9-2320-280-20-3, Para. 10-82	

8-2. Tact. Trucks cont.

<u>FUNCTIONAL GROUP CODE</u>	<u>DESCRIPTION OF CHANGE</u>	<u>TM AFFECTED</u>	<u>OTHER PUBLICATIONS</u>
3307	Rifle Mounting Kit, 57KO234, 2590-01-380-8283 (H VY, H11, H13, H14, H15, H16, H17, H18, H20, H21, H24, H25, H26, H27, H28)	9-2320-280-20-3, Para. 11-91	
3307	Steering Column Kit, 57K3216, 2530-01-380-9584 (HVY, H11, H13, H14, H 15, H 16, H 17, H18, H20, H21, H24, H25, H26, H27, H28)	9-2320-280-20-2, Para. 8-19	
3307	Sun Visor Kit, 57K3209, 2540-01-431-9182 (AVY, A11, A 13, A 14, A15, A20, A24, A25, A26, A27, B16, B17, B18, HVY, H11, H13, H14, H15, H16, H17, H18, H20, H21, H24, H25, H26, H27, H28)	9-2320-280-20-3, Para. 10-77	
3307	Windshield Retention Kit, 67K3206, 2540-01-431-1339 (HVY, H11, H13, H14, H15, H16, H17, H18, H20, H21, H24, H25, H26, H27, H28)	9-2320-280-20-3, Para. 10-24	
3307	Tailgate Upper Hinge Replacement Kit, 57KO107, 2510-01-364-3120 (HVY, H11, H13, H14, H17, H18, H20, H21, H24, H25, H26, H27, H28)	9-2320-280-20-3, Para. 10-62	
3307	Turn Signal Kit, 57K3222, 2540-01-431-1338 (AVY, A11, A13, A14, A15, A20, A24, A25, A26, A27, B16, B17, B18, HVY, H11, H13, H14, H15, H16, H17, H18, H20, H21, H24, H25, H26, H27, H28)	9-2320-280-24P	

8-2. Tact. Trucks cont.

<u>FUNCTIONAL, GROUP CODE</u>	<u>DESCRIPTION OF CHANGE</u>	<u>TM AFFECTED</u>	<u>OTHER PUBLICATIONS</u>
3307	Wheel Spacer Kit, 57K3215 (AVY, A11, A13, A14, A15, A20, A24, A25, A26, A27, B16, B17, B18, HVY, H11, H13, H14, H15, H16, H17, H18, H20, H21, H24 H25, H26, H27, H28)	9-2320-280-24P	
3307	Rear Seat Kit, 57K3196, 2510-01-410-7035 571K3197, 2510-01-410-7034 (AVY, A11, A13, A14, A15, A20, A24, A25, A26, A27, B16, B17, B18, HVY, H11, H13, H14, H15, H16, H17, H18, H20, 1121, H24, 1125, H26, H27, H28)	9-2320-280-24P	
4701	Speedometer Cable and Core Replacement	9-2320-280-20-2, Para. 4-15.1	
4702	Air Restriction Gauge Note	9-2320-280-10, Table 2-2 (PMCS)	
5203	A/C PMCS Checks Moved from Unit to Operator's Level	9-2320-280-10, Table 2-2 (PMCS)	

PUBLICATIONS AFFECTED:
N/A

LEVEL OF MAINTENANCE:
N/A

8-2. Miscellaneous

SUBJECT:

Widely used forms

POC:

Ms. Jody McInerney, AMSTA-IM-MTA, DSN 786-7346, Commercial
(810) 574-7346

mcinernj@cc.tacom.army.mil

COMMENTS:

Hey folks, in this edition to the TB, we've included a couple samples of some widely used forms (SF 368, Quality Deficiency Reports (QDRS) (see page 8-2) and DA Form 1045, Army Ideas of Excellence Program (AIEP) Proposal) (see page 8-3). These are the forms you use to supply us with the information and ideas we need to improve and better support our vehicles.

Two things to remember when filling out these forms:

1. A properly completed form will help us better understand your problem and be able to evaluate it quicker.
2. The more information you provide, the better.

Please keep your ideas and comments coming!

QUALITY DEFICIENCY REPORT (Category II)

SECTION I

1a. From (Originating point) HQ 105 Spt Bn FL Knox, KY 40121 DODAAC: W22PLM				2a. To (Screening point) Commander U. S. Army Tank-automotive Command Attn: AMSTA-QRT Warren, MI 48397-5000 DODAAC: W56H2V			
1b. Typed Name, Duty Phone and Signature John Doe DSN 687-1559				2b. Typed Name, Duty Phone and Signature			
3. Report Control No. WK3GFF930001		4. Date Deficiency Discovered 1 Nov 93		5. National Stock No. (NSN) XXXX-XX-XXX-XXXX		6. Nomenclature Deficient Item Name	
7. Manufacturer/Mfg. Code/Shipper AM General Livonia, MI				8. Mfg. Part No. (34623) 5581216		9. Serial/Lot/Batch No. 639-486	
10. Contract/PO/Document No. DAAD-05-C-93-KX							
11. Item <input checked="" type="checkbox"/> New <input type="checkbox"/> Repaired/Overhauled		12. Date Manufactured/Repaired/Overhauled UKN		13. Operating Time at Failure N/A		14. Government Furnished Material <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
15. Quantity		a. Received 10		b. Inspected 10		c. Deficient 8	
16. Deficient Item Works On/With		a. End Item (Aircraft, tank, ship, howitzer, etc.) M998 HMMWV		(1) Type/Model/Series M998 HMMWV		(2) Serial No. 44164	
b. Next Higher Assembly		(1) National Stock No. (NSN) 2320-01-107-7155		(2) Nomenclature M998 HMMWV		(3) Part No. N/A	
(4) Serial No./Lot No. 44164		17. Dollar Value		18. Est. Correction Cost		19. Item Under Warranty <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown	
20. Work Unit Code/EIC (Navy and Air Force only)		21. Action/Disposition <input checked="" type="checkbox"/> Holding Exhibit for 60 days <input type="checkbox"/> Released for Investigation <input type="checkbox"/> Returned to Stock/Disposed of <input type="checkbox"/> Repaired <input type="checkbox"/> Other (Explain in Item 22)		22. Details (Describe, to best ability, what is wrong, how and why, circumstances prior to difficulty, description of difficulty, cause, action taken including disposition, recommendations. Identify with related item number. Include and list supporting documents. Continue on separate sheet if necessary.)		23. Details (Describe, to best ability, what is wrong, how and why, circumstances prior to difficulty, description of difficulty, cause, action taken including disposition, recommendations. Identify with related item number. Include and list supporting documents. Continue on separate sheet if necessary.)	

- a. Utilization Code: 0
- b. Failure detected during normal operation of vehicle
- c. Stopped working (explain in detail the conditions present when the first sign of trouble was noticed)
- d. TM 9-2320-280-34P, Aug 91, w/change 1
- e. Normal use of vehicle in cross country travel (Put in all the details of what was happening before the equipment failed)
- d. Description of difficulty: Write a thorough description of the problem or need
- g. Outline most likely cause of the problem or need for improvement
- h. Action Taken
- i. Failure Code
- j. Recommendation - Give any suggestions to help stop problem, improve equipment or change instructions

SECTION II

23a. To (Action Point)		24a. To (Support Point) (Use Items 25 and 26 if more than one)	
23b. Typed Name, Duty Phone and Signature		24b. Typed Name, Duty Phone and Signature	
25a. To (Support Point)		26a. To (Support Point)	
25b. Typed Name, Duty Phone and Signature		26b. Typed Name, Duty Phone and Signature	

ARMY IDEAS FOR EXCELLENCE PROGRAM (AIEP) PROPOSAL

For use of this form, see AR 5-17. the proponent agency is OCSA

(See Privacy Act Statement and Instructions on Reverse. DO NOT FORWARD TOP PORTION TO EVALUATOR.)

1. Suggester Information

a. NAME OF SUGGESTER (Last, First, MI) Doe, John M.	b. SSN XXX-XX-XXXX	c. GRADE WG-
d. POSITION Mechanic	e. TITLE	
f. INSTALLATION OR ACTIVITY (Complete office address) YOUR INSTALLATION OR ACTIVITY Attn: AIEP Office CITY, STATE ZIP		g. OFFICE TELEPHONE (AV and Commercial) DSN XXX-XXXX
h. HOME ADDRESS (If you prefer to have communications on the suggestion sent to that address) Optional	i. SUGGESTER'S STATUS <input checked="" type="checkbox"/> Direct Hire Civilian <input type="checkbox"/> Active Military <input type="checkbox"/> Indirect-Hire Local National <input type="checkbox"/> Other (Specify)	

2. I, the suggester, acknowledge the following:

The acceptance by me of a cash award or other form of recognition for this suggestion shall constitute an agreement that the use of the suggestion by the United States shall not form the basis of a further claim of any nature upon the United States by me, my heirs, or assigns.

a. SIGNATURE OF SUGGESTER

b. DATE

3. Suggestion Information

a. SUBJECT OF SUGGESTION How to Submit Ideas	b. PRESCRIBING DIRECTIVE AND DATE (If applicable)	c. SUGGESTION NO.
d. DESCRIBE CURRENT PROCEDURE (If more space is needed, continue on a separate sheet) Explain the current procedure clearly. Be sure to indicate the end item your idea concerns or give the full nomenclatures for stock numbers or parts you are listing.		
e. DESCRIBE PROPOSED PROCEDURE Explain your idea clearly and with enough details and facts to fully explain the problem and your solution. Attach samples, drawings, or other documents that will help explain the problem and your solution.		
f. BENEFITS IF ADOPTED Sell your idea - the more you can explain about how your solution benefits, the better chance your idea has of being adopted.		

4. Program Coordinator Acknowledgment

Thank you for your suggestion. It has been assigned a number (shown in block 5c above). Your suggestion will be given careful consideration and you will be kept advised as to action taken.	a. SIGNATURE	b. DATE
--	---------------------	----------------

JACK 'EM UP! ... SAFELY!



Jack stands are all that keep you from Pancake City, mechanics. So, it pays to make sure they are standing tall.

Your first job is to make sure jack stands are standing straight. The slightest angle can make big problems:

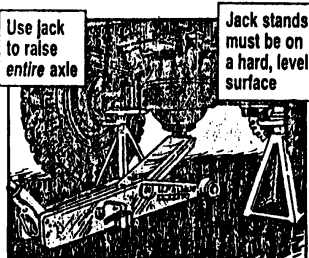
One, you can suffer big time, too—and you can't be repaired as easily as the vehicle.

Two, the vehicle will suffer big time if it falls off a stand.

Three, you're out a jack stand. It's not safe to use if it's damaged. TB 43-0142 has details on inspecting and load testing lifting devices.

So what can you do to protect jack stands, the vehicles and yourself? Here's what:

⚠ Park the vehicle on a level, hard surface.



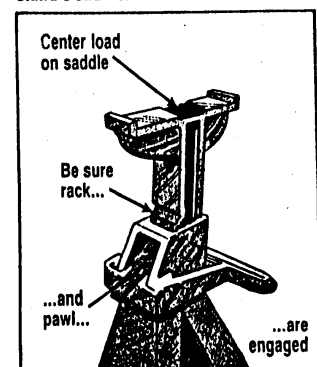
PS 505

12

DEC 94

⚠ Make sure all the stands you'll be using are straight. As little as a 5° tilt can cause a stand to buckle under a load.

⚠ Be sure the rack and pawl are both engaged and the load is centered on the stand's saddle.



⚠ Always use the stands in pairs.

⚠ Lower the jack slowly to ease the load onto the jack stands. Dropping the load onto the jack stands can ruin them.



⚠ Shut off the engine and set the hand brake.

⚠ Chock the wheels that won't be raised. That'll keep the vehicle from rolling.

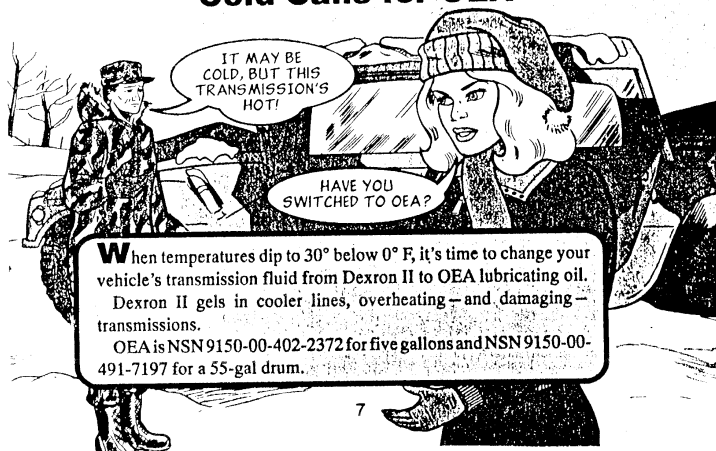
⚠ Use a dolly jack to raise the vehicle. If you're raising the entire axle, the best way is to lift from the middle and place both jack stands at the same time.

PS 505

13

DEC 94

Cold Calls for OEA



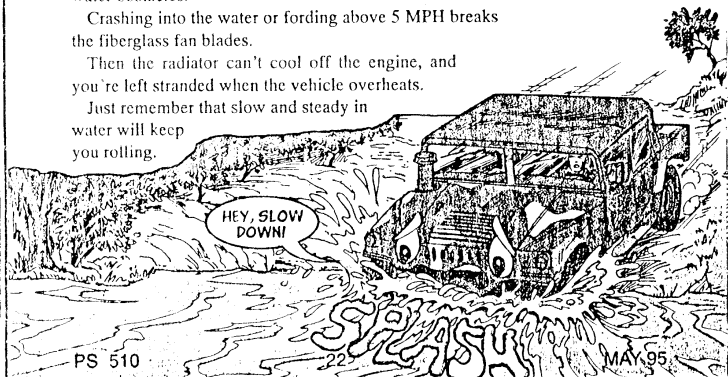
Go Slow When Fording

Operators, keep your HMMWV's speed slow and steady entering and fording water obstacles.

Crashing into the water or fording above 5 MPH breaks the fiberglass fan blades.

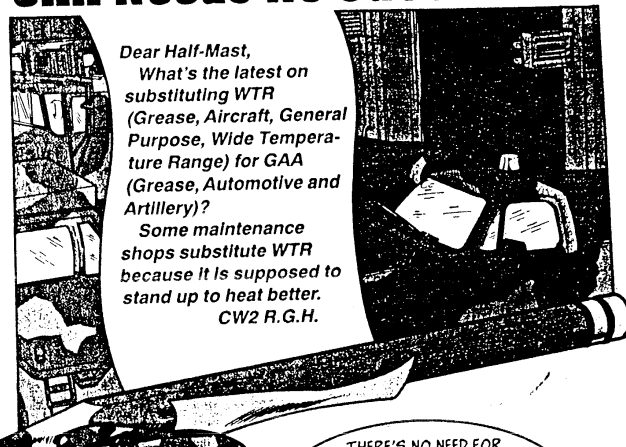
Then the radiator can't cool off the engine, and you're left stranded when the vehicle overheats.

Just remember that slow and steady in water will keep you rolling.



Lubrication...

GAA Needs No Substitutes



Dear Half-Mast,
What's the latest on substituting WTR (Grease, Aircraft, General Purpose, Wide Temperature Range) for GAA (Grease, Automotive and Artillery)?

Some maintenance shops substitute WTR because it is supposed to stand up to heat better.
CW2 R.G.H.

THERE'S NO NEED FOR A SUBSTITUTE, SIR. THE NEW GAA, MIL-G-10924E OR F HOLDS UP AS WELL AS WTR IN HEAT, AND PREVENTS CORROSION BETTER. USE THESE NSNs FOR THE NEW GREASE...

NSN 9150-01-197-	Size
7688	2.25-oz tube
7689	6.5-lb can
7690	1.75-lb can
7691	120-lb drum
7692	35-lb can
7693	14-oz cartridge for grease gun

HMMWV...

Lubing—More and Less



When the going gets tough, the intermediate steering shaft on the Humvee needs more grease.

On the other hand, the upper control arm ball joint needs less than you may think.

Steering Shaft

LO 9-2320-280-12 SAYS LUBE THE SHAFT every 3,000 miles or semiannually. That's in normal operation.

When driving isn't normal—high or low temps, high speeds, or long distances—more frequent lubing is needed.

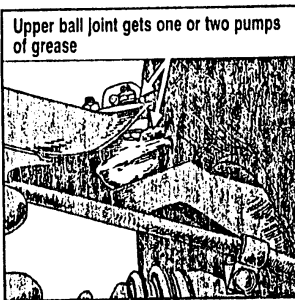


To save U-joints, you should hit all three grease fittings on the shaft every 1,000 miles. Note there are three fittings. Some operators forget the lower knuckle fitting because it's out of sight under the alternator.

Ball Joint

Grease the upper ball joint like the LO says—at 3,000 miles or semiannually.

But don't overlube it. Too much grease fills up the rubber boot. Hit a good bump and you'll pop the boot. Then you have to replace the ball joint.



8

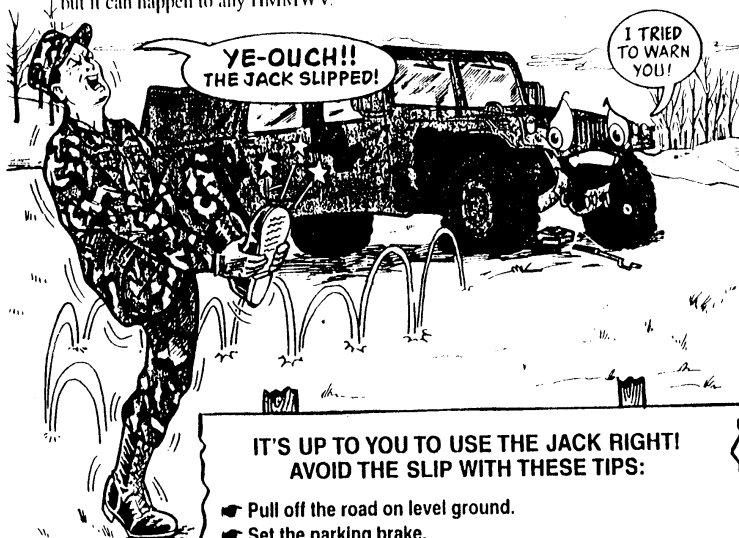
NOV 93

Jack the Slipper?

If you misuse the 2-ton jack when changing a HMMWV's tire, you'll create Jack the Slipper—with evil results.

The jack will hold the load, but if you position it wrong, or overload it, the jack will slip sideways. The vehicle can fall off the jack—and possibly onto you!

Shelter carriers are especially at risk because of their higher center of gravity, but it can happen to any HMMWV.



IT'S UP TO YOU TO USE THE JACK RIGHT! AVOID THE SLIP WITH THESE TIPS:

- Pull off the road on level ground.
- Set the parking brake.
- Chock both sides of a wheel on the opposite side.
- Center the jack directly under the lower control arm next to the wheel being changed. Placed anywhere else, such as the frame rails, the jack won't hold the load.
- Lift the tire only as high as needed to remove it. The higher you lift, the greater the chance the jack will slip.
- Lift only one wheel at a time or you'll overload the jack.



HE MUST'VE POSITIONED HIS JACK WRONG.

FEB 96

HMMWV...

PM LETS You

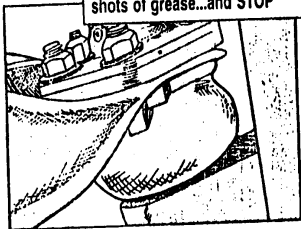
Old hand or new troop, you HMMWV drivers can use all the PM information you can get on your truck.

Some of the info you need is not in the operator's manual, so here's a roundup of PM tips you can use to keep truckin'.

Hold the Grease

Too much grease is as bad as too little in the ball joints. If you pump in too much grease, the joint's rubber boot pops open. The whole ball joint has to be replaced.

Give each ball joint one or two shots of grease...and STOP

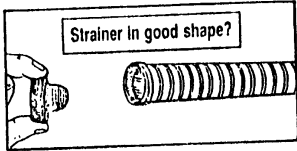


Keep It Clean

Your HMMWV needs clean fuel to run. When you refuel your vehicle — especially out of a 5-gal can — go easy with the nozzle. Slamming it into the filler pipe damages the strainer inside. That lets dirty fuel clog up filters down the line.

Make sure the strainer in the fuel can is in good shape, too.

Strainer in good shape?

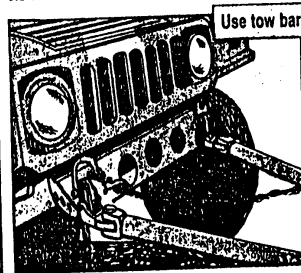


Purple Only

When you add brake fluid, make sure the can is labeled silicone brake fluid and the fluid's purple. Any other fluid gums up the equalizer valve and master cylinder, and jells in the system. That makes for a big job to take the brake system apart and clean it.

Tow Bar Only

Always use a tow bar to tow a Humvee. Using a chain lets the truck bang into the towing vehicle and smash its front end.



Use tow bar

Brake Light Test

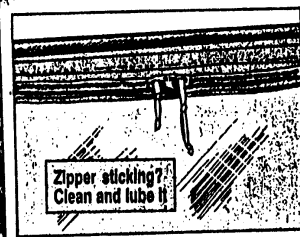
There's only one way to be sure the brake lights will light up on the road. Get a buddy to watch while you drive the truck forward in the motor pool. Push down on the brake pedal about 1/4 inch (that's the free travel). The brake lights should come on. If not, report it.

Watch for lights



Zipper Lube

When the zipper is sticking on a soft-top HMMWV's plastic window, use zipper lube to grease the skids. First, though, clean out any grit or dust in the zipper teeth with an old toothbrush. Then rub the zipper generously with zipper lube, NSN 9150-00-999-7548.



Zipper sticking?
Clean and lube it



GROUND MOBILITY

EXTREME PM FOR EXTREME COLD

There are several degrees of cold. There's "plain, old ordinary" cold (down to zero), "really" cold (to 10 below) and then there's "extreme" cold—where the thermometer can drop from -10 to -65 degrees like a one-way yo-yo.

If you're in an "extreme" cold weather area, here are a few things you can expect:

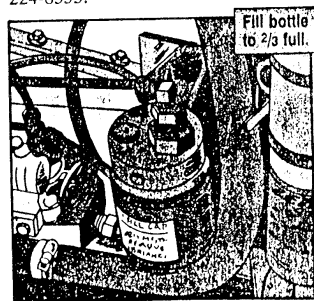
☐ CUCV and HMMWV alternator/generator belts snap in cold temperatures. Keep the belts from breaking by warming them with a 400,000 BTU duct-type heater before starting the engine. Do not rev the engine while it warms up. Keep extra belts on hand.



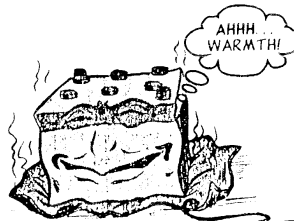
☐ The boom on a 5-ton wrecker "stiffens up" when the hydraulic fluid gets thick. Change the OE to OEA (sub-zero lube) for cold weather operations. Get a 5-gal can with NSN 9150-00-402-2372.



☐ Water left from condensation causes brake systems to freeze solid. An alcohol evaporator keeps moisture from freezing. Eyeball the evaporator bottle daily to make sure it's at least two-thirds full of methyl alcohol. Get a gallon can with NSN 6810-00-597-3608, a 5-gal can with NSN 6810-00-275-6010, or a 55-gal drum with NSN 6810-00-224-8353.



☐ Battery heating pads are the best bet for keeping a battery warm.

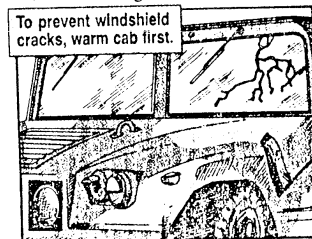


☐ Never apply the parking brake. It will freeze. Instead, chock the wheels of your truck or trailer.

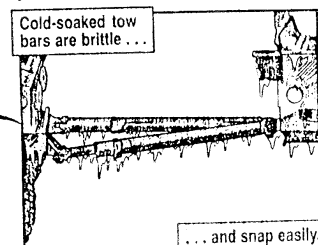
☐ The tires on your equipment freeze to the ground if you don't move your equipment often. Use dry tree limbs, brush, or cardboard under tires when you park. If the tires get stuck, be sure to use a blunt tool to chip them out—don't gouge your tires.

OCT 93

☐ Sudden changes in temperature crack windshields. Help prevent busted windshields by warming the cab with the personnel heater. After the cab's warm, turn the heater defroster on LOW—never throw it on full blast to warm and defog the windshield.



☐ Cold-soaked tow bars, pins, hooks and pintles snap on you. Tubular tow bars and steel cables work a little better, but watch out for sudden bumps and jerks.



☐ M973 SUSV tracks must be adjusted outside where you're operating. If they're adjusted where it's warm, the track will tighten up and break when it hits the cold.

7

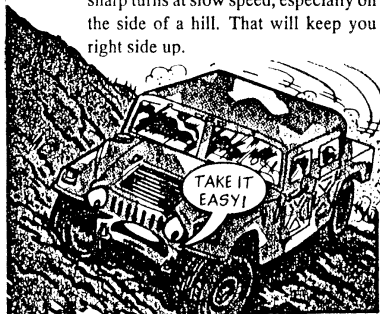
COMMON SENSE



The Humvee is a stable vehicle, but it can be flipped.

You drivers keep those trucks right side up by keeping these few things in mind when driving the truck.

⤵ Slow down for turns. Keep your vehicle steady when making turns. Make sharp turns at slow speed, especially on the side of a hill. That will keep you right side up.



PS 496

⤵ Avoid panic stops. Give yourself plenty of distance to stop.



⤵ Stay alert. Safe driving depends on knowing your vehicle and road conditions at all times. Normal speed becomes high speed as road conditions worsen.

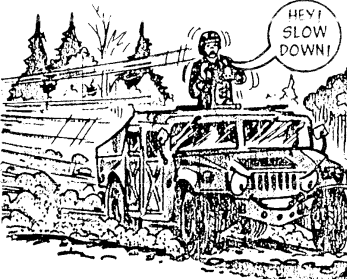


50

DRIVING



⤵ Speed kills. Keep speed matched to road conditions. Slow down when roads are wet or slippery and when you're driving cross country.



⤵ Avoid jackrabbit starts. Steady as it goes is best



PS 496

⤵ Avoid obstacles. Resist the temptation to tame stumps, big rocks and boulders. Go around them when you can. If you hit them wrong, you can dump the load — that includes any passengers you may be hauling.



To be a safe Humvee driver, read and heed the word in your-10 TM. Then get real familiar with the dope in FM 21-305, Manual for the Wheeled Vehicle Driver.



51

COPING WITH THE COLD



Operating in the cold calls for something extra. And that something extra starts with good maintenance habits. This is simply orienting yourself for conditions that will actually exist — conditions that can frustrate the best mechanics and operators if they're not ready to meet the hazards head on.

In cold weather, there is hidden danger to equipment and soldiers.

- * **LUBRICANTS** become stiff and hard to use.
- * **PLASTIC AND HARD RUBBER PARTS** become brittle. A hard knock or a sharp bend may snap them.
- * **GAUGES AND DIALS** stick and give wrong readings.
- * **BRAKES** freeze to drums when wet.
- * **FUEL TANKS, FILTERS AND LINES** freeze tight or ice up from condensation.
- * **LINKAGES** get stiff, causing hard operation or delayed response.
- * **PAINT** becomes brittle and cracks easily.
- * **CRANKCASES** sludge up from condensation caused by short runs.
- * **BATTERY** efficiency is cut. They freeze and crack when discharged.
- * **ENGINES** are hard to start, with threat of hydrostatic lock.
- * **MACHINED AND UNPAINTED SURFACES** rust and corrode quickly.
- * **DRAIN COCKS AND PLUGS** freeze tight, discouraging daily or periodic draining.
- * **POWER TRAIN BREATHERS AND VENTS** clog from slush and freeze closed.
- * **WINDSHIELDS** crack easily when hit by a blast of cold air from the defroster.
- * **PERSONNEL EFFICIENCY** drops.

You learn right off that just about any task may take twice as long to do. So make sure you allow enough time to get the job done right.

And since the wind-chill factor can have you operating at -50°F at times, make sure there are at least two people assigned to any outside task. Not only is the extra help needed, but each can watch the other for signs of frostbite, which can strike FAST!

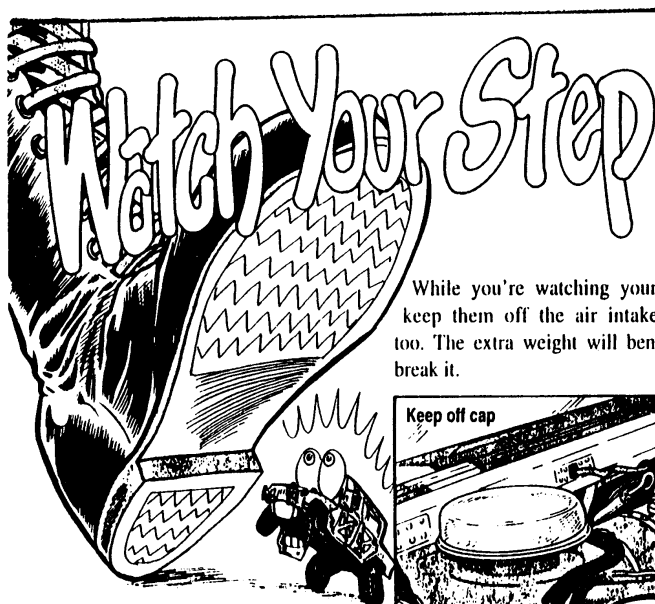
Winter PM Checklist

- * Be acquainted with the cold weather operation portion of your operator's TM.
- * Lubricate according to the temperature range on your gear's LO.
- * Keep your extreme cold-weather TMs, TBs, FMs and other cold-weather pubs within reach for quick reference. Look 'em over before the cold blast hits to offset any trouble due to lack of know-how.
- * Try no short-cuts, alterations or repairs that are beyond your MOS.
- * When in doubt whether winterization treatments apply, check with someone who knows.

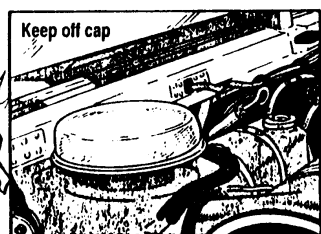
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1



While you're watching your feet, keep them off the air intake cap, too. The extra weight will bend and break it.



Keep off cap

Here it is, big as life, painted right on top of the HMMWV's air intake tube—**NO STEP**.

The tube looks sturdy, but it cracks when a boot bears down on it. Once it's open, it lets dirt, dust and crud into the engine. Your truck will soon be heading for repair.



"NO STEP" means NO STEP!

PS 519

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FEB 96

On the Outside

You've got to watch your feet on the outside of the HMMWV, too.

Never walk on the hood. It's made of fiberglass, and will crack. The plastic grille looks tough, but will crack easily under a soldier's weight.



Stay off hood

Your best bet around a HMMWV is to keep your feet on the ground.

Leaks Have Class

Most TMs say it's OK to operate your vehicle with minor leaks (Class I or II). Just keep an eye on the fluid level in the component and do the PMCS.

But if the leak graduates from Class II to Class III, park your vehicle and call a mechanic. Class III leaks make your vehicle NMC.

How do you know when a leak is Class I, II or III?

Here's a simple way to classify leaks by using coffee as an example.



Class I

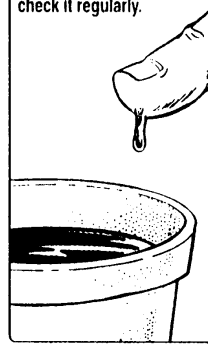
Dip your finger in a cold cup of coffee and then wipe your finger across your forearm. There will be some dampness, a little stain, but no drops. This is what a Class I leak looks like. On your equipment, wipe the area dry and keep an eye on it.



PS 529

Class II

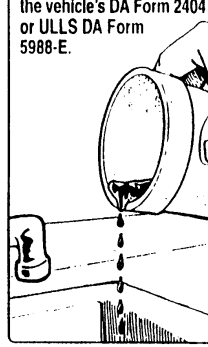
Stick your finger in the coffee again, and then hold it over the cup. Notice the drop that refuses to fall, Class II leaks form drops that are not heavy enough to drip. They're most often caused by seal and gasket wear. Clean the spot and check it regularly.



11

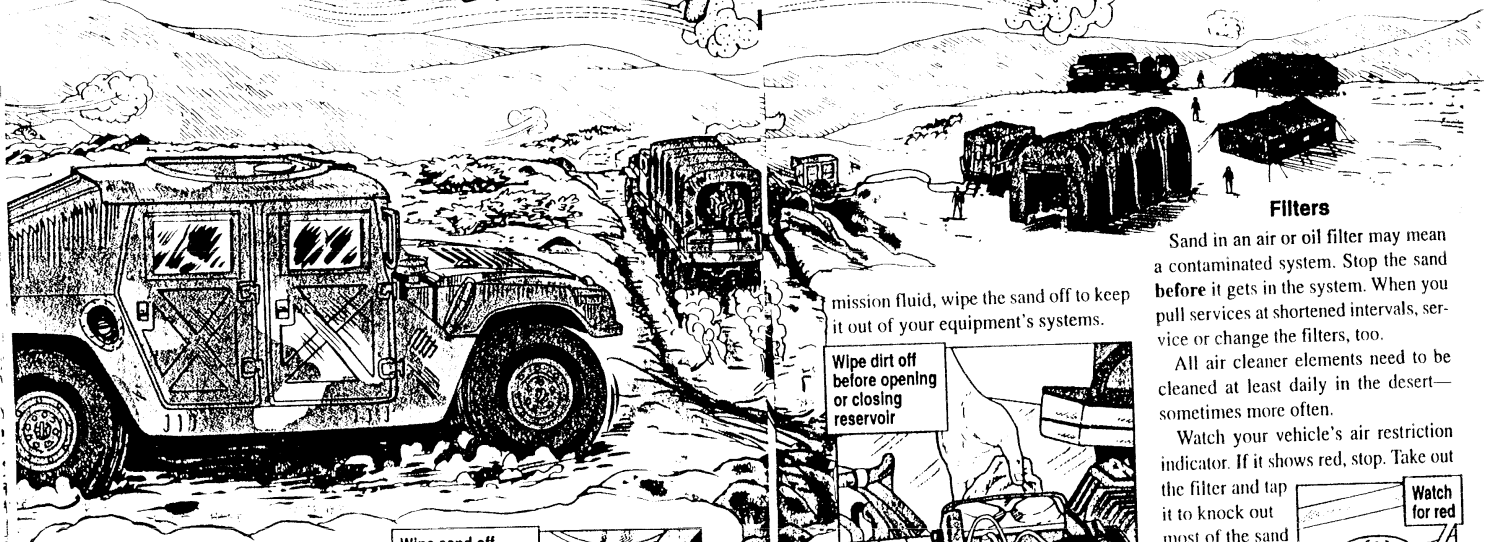
Class III

To see what a Class III leak looks like, slowly tilt your coffee cup over a sink. Watch as a few drops fall into the sink. That's what happens when seals and gaskets are totally worn out. Report Class III leaks and record them on the vehicle's DA Form 2404 or ULLS DA Form 5988-E.



DEC 96

Shifting Sands



Filters

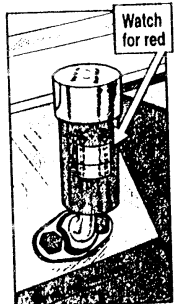
Sand in an air or oil filter may mean a contaminated system. Stop the sand **before** it gets in the system. When you pull services at shortened intervals, service or change the filters, too.

All air cleaner elements need to be cleaned at least daily in the desert—sometimes more often.

Watch your vehicle's air restriction indicator. If it shows red, stop. Take out the filter and tap it to knock out most of the sand and dirt. Never bang it against a rock or tire. That bends the filter's edge.

Use an air hose to blow away stubborn dirt and sand. Make sure it's no more than 30 psi. If the vehicle still can't get enough air, get your mechanic to wash or replace the filter.

Remember, sand-free systems may decide the outcome of a battle.



mission fluid, wipe the sand off to keep it out of your equipment's systems.

Wipe dirt off before opening or closing reservoir



Then check the inside of all caps, openings, dipsticks and fill ports one more time before you replace the caps.

Never leave lids off grease and oil containers. Sand gets in the cans if the lids are off. Keep grease guns protected, too.

Before plugging in the grease gun, wipe off grease fittings. Otherwise, you pump in sand.

When the bearing is lubed, leave it. If you wipe off excess grease after lubing, you push sand past the bearing's seal.

PS 525

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AUG 96

When your equipment is out in the blowing sand, lube and filters get mighty crucial.

In the desert, remember to keep an eye on hydraulic cylinders, brake master cylinder caps, air cleaner elements and oil filters...anything involving lube or air.

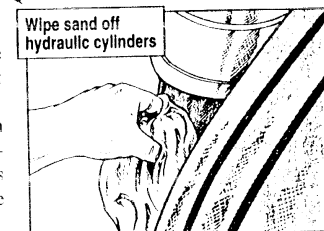
Lubing

Too little lube and parts lock up.

Yet, too much lube catches sand and turns your lube into sandpaper.

If there's sand on a hydraulic cylinder rod, wipe it off. Sand on the rod cuts oil seals, causing leaks.

PS 525



Cut the oil change intervals in half. For instance, if the I.O. says to change the oil every 12,000 miles, change it at 6,000. Change the oil more often if the conditions are really bad.

Before opening any lube cap, whether it contains oil, brake or trans-

22

AUG 96

Chapter 01

ENGINE

Functional
Group Code
0100-0106

3-9. Tactical Trucks

MODEL:

CUCV/HMMWV

SUBJECT:

Use of Cylinder Sleeves on 6.2L Engines

POC:

Mr. Eric Sutman, AMSTA-MTA, DSN 786-7151, Commercial (313) 574-7151

DEFICIENCY:

You must replace the 6.2L engine cylinder block if it has a cylinder that you must oversize more than .030".

COMMENTS:

We've adopted a suggestion to use cylinder sleeves to repair the engine. If a cylinder is pitted or worn such that you can't hone it and use a high limit or oversized piston to repair it, you can use a cylinder sleeve to repair the engine block. If you don't have the tools necessary to install the sleeve, you can have the sleeve installed at a local engine repair shop. Whether you install the sleeve yourself or have it installed at a local repair shop, the procedures below must be followed. The sleeve can't be used to repair a cracked block.

MATERIAL/PARTS:

Ertel Manufacturing Corp. Cylinder Sleeve P/N SL1152 (92947) or comparable cylinder sleeve
Sealing Compound, NSN 8030-01-268-5917

PROCEDURE:

1. Identify cylinders that require sleeves. Cylinders that still show damage or wear after being honed to a maximum oversize of .030" will require sleeves.
2. Use a micrometer to measure the outside diameter of the cylinder sleeve.
3. Bore the cylinder to the diameter of the sleeve less .002" to .003", to create an interference fit between the sleeve and the cylinder wall.
4. Bore the cylinder to within 0.125" of the rod relief in the bottom of the cylinder. Make sure the depth of the bore doesn't exceed the length of the sleeve. Make sure to cut the bottom of the bore square This will provide a stop for the sleeve.

NOTE

Store the sleeve in a freezer at a temperature of 28-30 degrees Fahrenheit for several hours before installing it in the engine block.

5. Apply a bead of sealing compound to the top and bottom of the cylinder bore. Press a frozen sleeve into the cylinder until it bottoms out on the ledge at the bottom of the cylinder bore.
6. Remove any excess sleeve material protruding above the head deck surface. Finish the sleeve flush with the deck of the block, taking care not to damage the deck surface.
7. Bore the sleeved cylinder to the appropriate piston size.
8. Use the procedures in TM 9-2815-237-34, paragraph 2-16.d to finish the cylinder surface.

PUBLICATIONS AFFECTED:

TM9-2815-237-34

TM9-2320-289-34

LEVEL OF MAINTENANCE:

General Support

3-11. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Engine Block Repair

POC:

Mr. Daniel Dudek, AMSTA-IM-MTA, DSN 786-7416, Commercial (810) 574-7416 dudekd@cc.tacom.army.mil

COMMENTS:

The HMMWV Engine Manual does not list cylinder boring as a method of repair for the engine block. The following instruction for cylinder boring will be added to paragraph 2-16.d, Cylinder Block Repair, in a future change or revision to TM9-2815-237-34.

PROCEDURE:**NOTE**

If cylinder block inspection indicated that the cylinder block was suitable for continued use except for out-of-round, taper, or minor nicks or scratches, it can be conditioned by honing or boring.

(1) Boring:

- a. Before using any type boring bar, the top of the cylinder block should be filed off to remove any dirt or burrs. This is very important. If not checked, the boring bar may be tilted which would result in the rebored cylinder wall not being at right angles to the crankshaft.
- b. Measure piston diameter of the piston to be used at the skirt across the center line of the piston pin.
- c. Using a boring bar, bore the cylinder to the same diameter as the piston. Hone the cylinder to get proper piston to bore clearance.
- d. Repeat steps b and c for remaining cylinders.

PUBLICATIONS AFFECTED:

TM9-2815-237-34

LEVEL OF MAINTENANCE:

General Support

MODEL:

M998 Series Vehicles

SUBJECT:

Replacement Engine Assemblies

POC:

Ms. Jody McInerney, AMSTA-IM-MTA, DSN 786-7346, Commercial (810) 574-7346
mcinernj@cc.tacom.army.mil

COMMENTS:

When you replace your engine assembly with a new one, make sure you remove the extra flat washer located under the fan drive assembly mounting bolts. This washer is for shipping purposes only. If not removed, the screw and stud will rub together when the fan clutch is disengaged.

PUBLICATIONS AFFECTED :

None

LEVEL OF MAINTENANCE:

Direct Support

MODEL:

M998 Series HMMWV

SUBJECT:

Engine Piston to Cylinder Specifications

POC:

Ms. Patti Grashik, AMSTA-IM-MTA, DSN 786-7713, Commercial (810) 574-7713
grashikp@cc.tacom.army.mil

COMMENTS:

The HMMVVV engine manual does not list piston to cylinder specifications. The following information will be added to TM9-2815-237-34, Section VII, Repair and Replacement Standards.

PISTON - CYLINDER SPECIFICATION

<u>PISTON</u>	<u>PISTON SIZE</u>	<u>CYLINDER SIZE</u>
6.2 Diesel Engine:		
Standard (11862)23500391 2815-01-246-5268	3.9749" to 3.9754"	3.9778" to 3.9784"
Standard High Limit (11862)23500392 2815-01-164-0138	3.9759" to 3.9765"	3.9788" to 3.9794"
Oversize (2)* (11862)23500393(3)* 2815-01-246-5269	4.0044" to 4.0050" 4.0050" to 4.0055"	4.0074" to 4.0079" 4.0079" to 4.0085"

***NOTE:** GM oversize pistons come in two sizes under one part number. They can be identified by the number stamped on the face of the piston.

Use standard ring set, part number (11862) 15537018, NSN 2815-01-163-7838, with standard and standard high limit pistons. Oversize piston (.75 mm) ring set part number is (11862) 15537020, NSN 2815-01-163-9999.

6.5L Diesel Engine (HMMWV FOV A2 models):

<u>PISTON</u>	<u>PISTON SIZE</u>	<u>CYLINDER SIZE</u>
Standard (11862)12550059	4.0529" to 4.0534"	4.0571" to 4.0576"
.50 mm Oversized (11862)12550062	4.0739" to 4.0745"	4.0782" to 4.0787"

Piston ring set part numbers are standard, (11862) 12510752, and .50 mm oversized, (11862) 12510753.

NOTE: NSNs aren't available yet. 6.5L engine doesn't have a standard high limit piston.

PUBLICATIONS AFFECTED :
TM9-2815-237-34

LEVEL OF MAINTENANCE :
General Support

MODEL:
All HMMWV's and CUCVs

SUBJECT:
Valve Cover and Oil Pan Gaskets

POC:
Ms. Jody McInerney, AMSTA-MTA, DSN 786-7346, Commercial (313) 574-7346

DEFICIENCY:
At the present time, RTV Silicone is used to form a gasket on the valve covers and oil pan. It would save time if units were able to use a gasket instead of the RTV Silicone.

COMMENTS:

Because of a suggestion, it's possible for units to use gaskets in lieu of RTV Silicone. Below are the part numbers and NSNs for the gaskets that will appear in the next change to the TM:

- A. Valve Cover Gasket
Part Number: (73165) 91599
NSN: 5330-01-372-0636
- B. Oil Pan Gasket:
Part Number: (73165) OS 30442A
NSN: 5330-01-310-6780

PUBLICATIONS AFFECTED:

TM9-2320-280-20P and 34P
TM9-2320-280-20-2
TM9-2320-289-20P and 34P
TM9-2815-237-34 and 34P

LEVEL OF MAINTENANCE:

Unit, Direct Support and General Support

MODEL:

CUCV/HMMWV

SUBJECT:

6.2 Liter Diesel Engine Connecting Rod Bearings (.010" Oversize), NSN 2815-01- 165-4826

POC:

Mr. John Kandrot, AMSTA-IM-MTA, DSN 786-8288, Commercial (810) 574-8288
kandrotj@cc.tacom.army.mil

DEFICIENCY:

After engine crankshaft grinding all the connecting rod bearings need to be replaced with oversized ones. Currently they are only available as individual pairs.

COMMENTS:

- A. As a result of an approved suggestion, the .010" oversize connecting rod bearings will be provisioned as a complete set of 8 pairs. This makes ordering easier and reduces packaging costs.

B. They can be local purchased from ACL Automotive, 2488 Tuckerstone Parkway, Tucker, Georgia 30084; Phone 1-800-241-3498 using CAGEC (01RE5), part number 8BI286P until they can be provisioned and assigned a separate NSN. The field will be advised of the stock number in a future article.

C. Also, provided are the complete sets of main and camshaft bearings that have been provisioned.

(1) Main bearings	NSN 3120-01-376-0632	(73160) P/N 5129m.25mm
(2) Camshaft bearings	NSN 3120-01-152-2611	(OBOB1) P/N SH1366S

PUBLICATIONS AFFECTED :

TM9-2320-289-34P TM9-2815-237-34P

LEVEL OF MAINTENANCE:

General Support

4-7. Tactical Trucks

MODEL:

All Tactical Vehicles

SUBJECT:

Drain Cock Adapter

POC:

Mr. Darius Greene, AMSTA-MTB, DSN 786-7342, Commercial (810) 574-7342

COMMENTS:

Often the equipment's drain cock is in a location that would cause the fluid to be drained, to splash on other parts of the equipment and cause a hazardous waste mess. Units may use the procedures below to fabricate an "adapter" which will help in controlling the amount of spillage.

PROCEDURES:

A. Obtain a 3/4" inside diameter rubber hose (4720-00-489-5350) and cut the hose to the required length. The length should be the distance from the drain cock to the drain pan.

B. Cut a 1/2" wide by 1" deep section from one end of the hose.

C. Drill or cut a hole equivalent to the size of the drain cock "wings", through both sides of the hose at

the base of the section cut out in step B.

D. Insert the 'wings" of the drain cock through the holes made in step C to attach the hose to the drain cock.

E. When the drain cock is opened, the fluid will flow through the hose and into the drain pan. Remove the hose and close the drain cock when draining is completed.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit

3-11. Tactical Trucks**MODEL:**

M998 and M998AI Series Vehicles with 6.2 Liter Diesel Engine

SUBJECT:

Fabrication and Use of Cylinder Head Lifting Device

POC:Mr. Daniel Dudek, AMSTA-IM-HIA, DSN 786-7493,
Commercial (810) 574-7493 dudekd@cc.tacom.army.mil**DEFICIENCY:**

Reports from the field indicate that a cylinder head lifting device would help in removal of in-vehicle 6.2 liter diesel engine cylinder heads.

COMMENTS:

Instructions have been developed for the fabrication and use of a cylinder head lifting device which will aid in removal and installation of 6.2 liter diesel engine cylinder heads. This can be accomplished by using the following instructions and materials.

MATERIALS/PARTS:

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
9510-00-224-1692	Bar, Metal, 0.625-inch Diameter	A/R
9510-00-287-9402	Bar, Metal, 1-inch Diameter	A/R
9510-00-596-1405	Bar, Metal, 0.375-inch Diameter	A/R
5310-01-186-1254	Washer, Flat	2

PROCEDURES:**A. Fabrication of Cylinder Head Lifting Device.**

1. Using NSN 9510-00-224-1692 metal bar (1), cut a 14.00-inch long section. (see figure 3-20) Bend metal bar (1). (see figure 3-21)
2. Using NSN 9510-00-596-1405 metal bar (2), cut a 11.50-inch long section. (see figure 3-20) Bend metal bar (2). (see figure 3-21)
3. Using NSN 9510-00-287-9402 metal bar (3), cut a 8.00-inch long section. (see figure 3-20) Drill four 0.437-in. diameter holes through metal bar (3). (see figure 3-21)
4. Weld all three metal bars together. (see figure 3-21)

3-1 1. Tact. Trucks cont.

B. Utilization of Cylinder Head Lifting Device.

1. Prepare cylinder head for removal. (Refer to TM9-2320-280-34.)
2. Install cylinder head lifting device (1) on center two rocker arm saddles (5) of left or right cylinder head (4) with two NSN 5310-01-186-1254 washers (3) and existing screws (2) used to secure rocker arm assembly to cylinder head (4). (see figure 3-22)
3. Remove cylinder head with the aid of a hoist or other suitable lifting equipment.
4. Remove two screws (2), washers (3), and cylinder head lifting device (1) from rocker arm saddles (5).
5. Repeat steps 2, 3, and 4 to remove other cylinder head if required.
6. Position cylinder head on engine in the same way as removed with cylinder head lifting device.
7. Installation of cylinder head.(Refer to TM9-2320-280-34.)

PUBLICATIONS AFFECTED:

TM9-2320-280-34

LEVEL OF MAINTENANCE:

Direct and General Support

NOTES:

- (1) ALL DIMENSIONS ARE IN INCHES.
- (2) MATERIAL:
 - A. STEEL, CARBON, ROUND BAR,
1020, IAW ASTM A108
0.625 X 14.0 METAL BAR
0.374 X 11.5 METAL BAR
1.0 X 8.0 METAL BAR
 - B. OR SUITABLE SUBSTITUTE
- (3) REMOVE ALL BURRS AND SHARP EDGES.

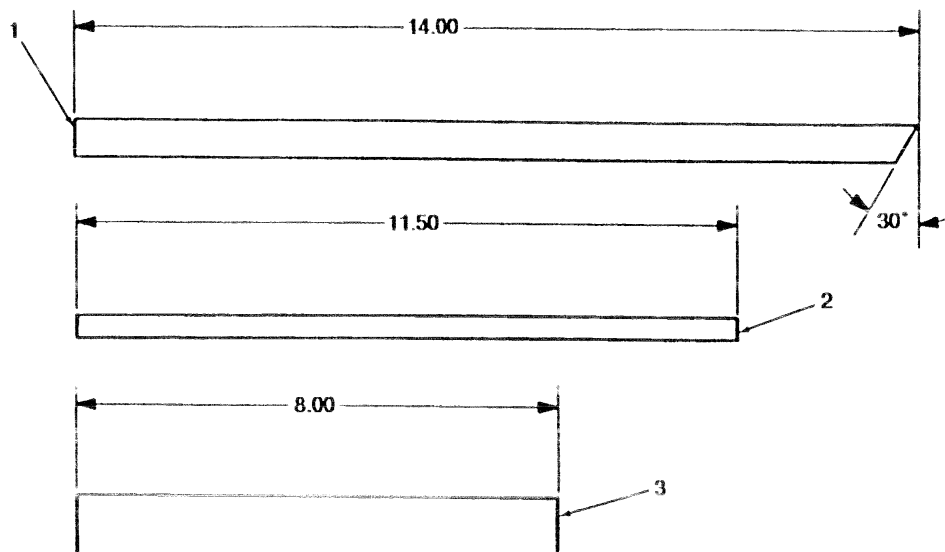


FIGURE 3-20

NOTES:

- (1) ALL DIMENSIONS ARE IN INCHES.
- (2) ALL WELDS SHALL BE IAW MIL-STD-1261 CLASS 2.
- (3) ALL WELD SIZES ARE MINIMUM.

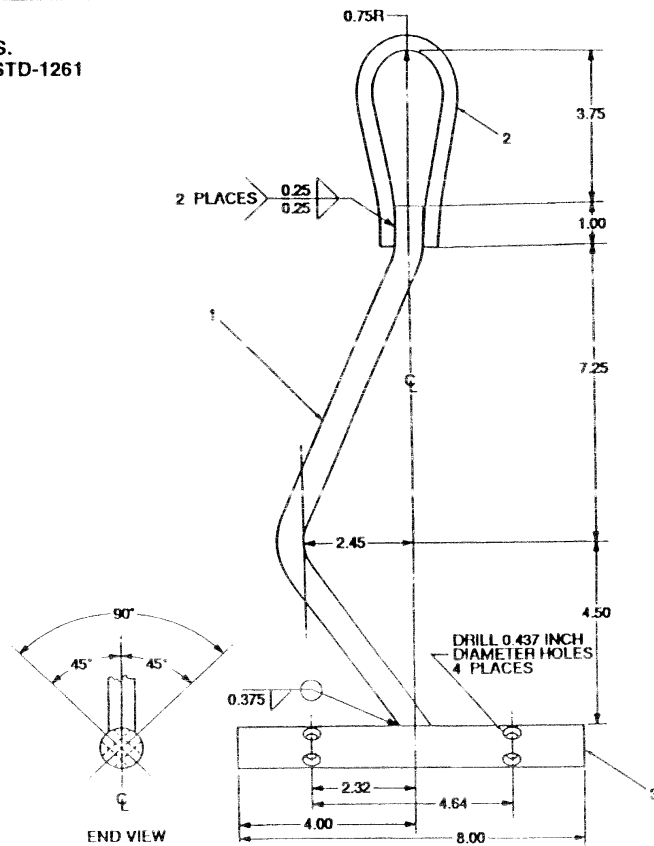


FIGURE 3-21

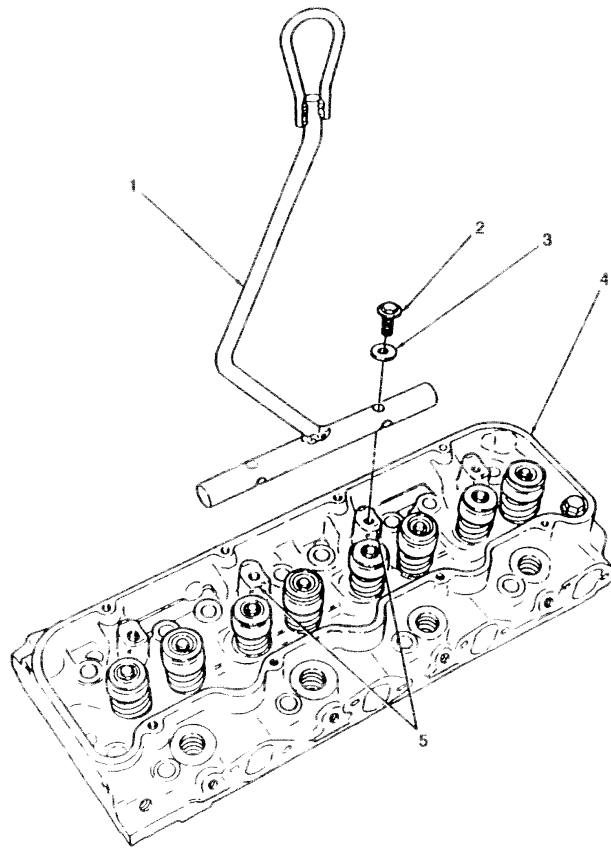


FIGURE 3-22

3-10. Tactical Trucks

MODEL:

All M998 and M998AI Series HMMWV

SUBJECT:

Rubbing and chafing of Engine Compartment Hardware

POC:

Ms. Leona Milas, AMSTA-IM-MTA, DSN 786-7346, Commercial (810) 574-7346

milasl@cc.tacom.army.mil

DEFICIENCY:

Reports from the field indicate the two left windshield washer hose clamps cause wear on the hood. The hydro-boost return hose rubs against the alternator which may result in hose leakage. Starter wire 74A rubs against the transmission cooling line and injector pump wire 569B rubs against the air horn. The rubbing causes insulation to wear off, resulting in metal-to-metal contact which could lead to electrical problems.

COMMENTS:

Procedures have been developed to reposition the clamps, wires, and hose to prevent premature wear and tear. These corrective actions can be accomplished in the field by using the following parts and ,procedure.

MATERIALS/PARTS:

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
5975-00-074-2072	Strap, Tiedown	3

PROCEDURES:

A. Repositioning Windshield Washer Clamps.

1. Remove nut (7), washer (8), clamp (9), screw (10), and washer (8) securing hose (1) to top of body hood rail (6) on A-pillar (5). (see figure 3-6)
2. Remove nut (3), washer (4), two clamps (2), screw (11), and washer (4) securing two hoses (1) and (12) to top of body hood rail (6) on A-pillar (5).

3-10. Tact. Trucks cont.

3. Position two clamps (2) and hoses (1) and (12) under body hood rail (8) on A-pillar (5) and install with washer (3), screw (4), washer (3), and nut (11). (see figure 3-7)

4. Position clamp (10) and hose (1) under body hood rail(8)on A-pillar(5) and install with washer (6), screw (7), washer (6), and nut (9).

B. Repositioning Hydro-boost Return Hose. Secure hydro-boost return hose (1) to control valve return hose (3) with NSN 5975-00-074-2072 tiedown strap (2). (see figure 3-8)

C. Repositioning Starter Wire 74A.

NOTE

Position wire 74A In place and ensure wire 74A will not rub against transmission cooling line once It has been secured to wire 8 1A.

Secure starter wire 74A (3) to starter wire 81A (2) with NSN 5975-00-074-2072 tiedown strap (1). (see figure 3-9)

D. Repositioning Injector Pump Wire 569B. Secure injector pump wire 569B (3) to injector pump wire 54A (1) with NSN 5975-00-074-2072 tiedown strap (2). (see figure 3-10)

PUBLICATIONS AFFECTED:

TM9-2320-280-34

TM9-2320-280-20P

TM9-2320-280-34P

LEVEL OF MAINTENANCE:

Unit

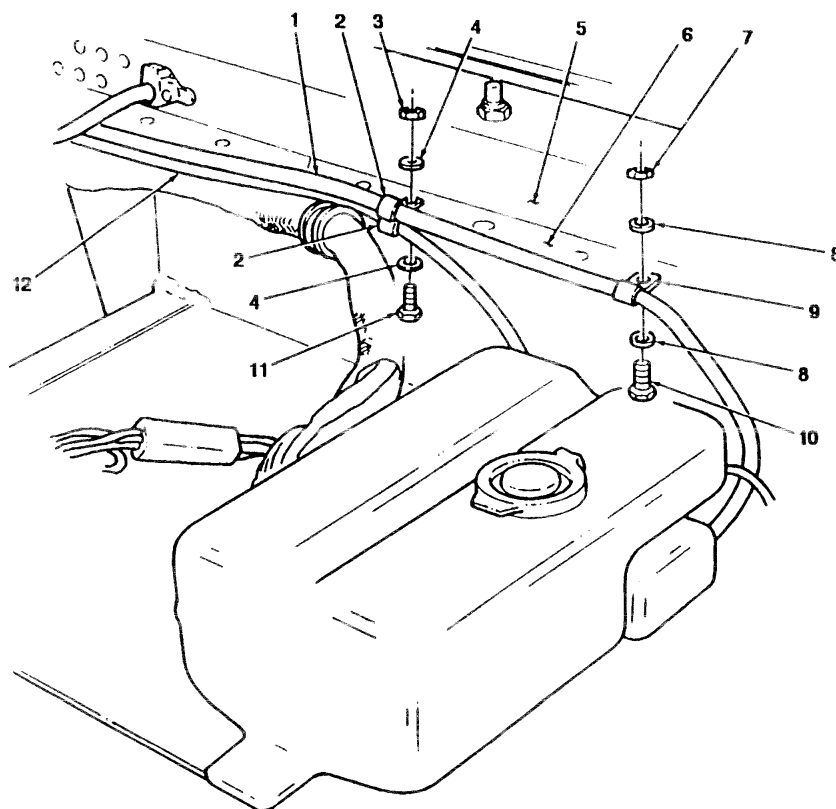


FIGURE 3-6

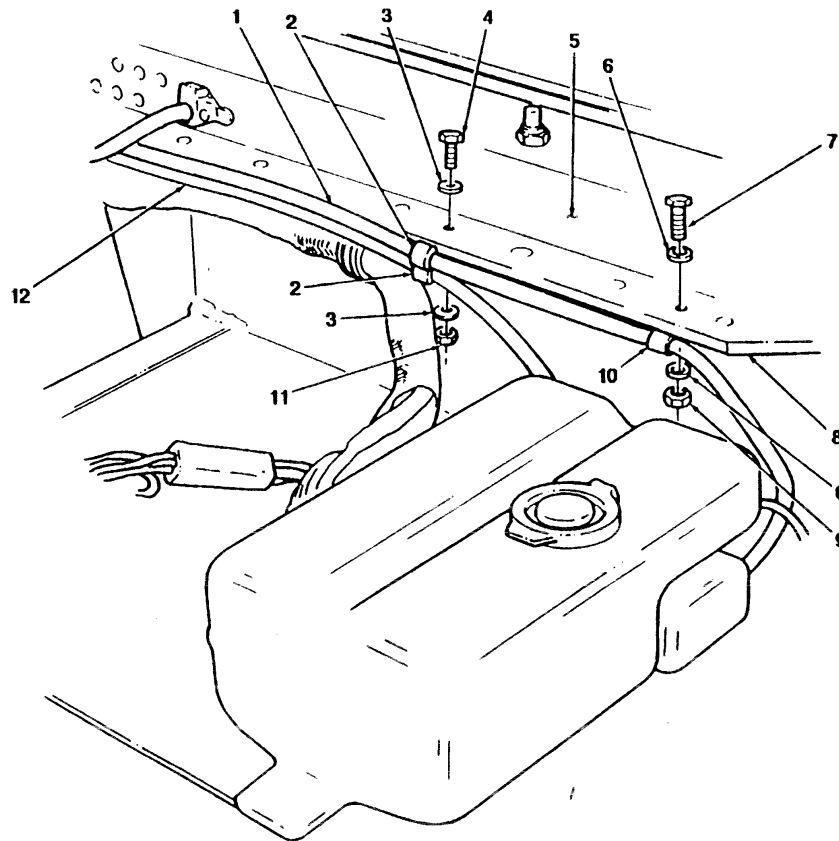


FIGURE 3-7

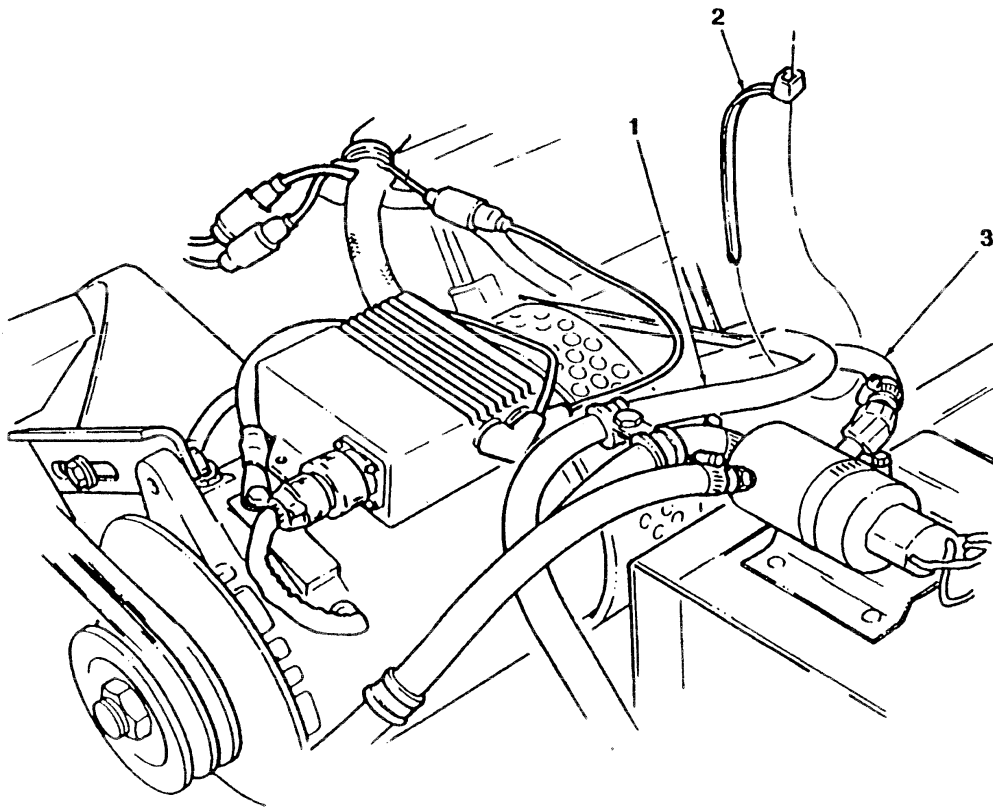


FIGURE 3-8

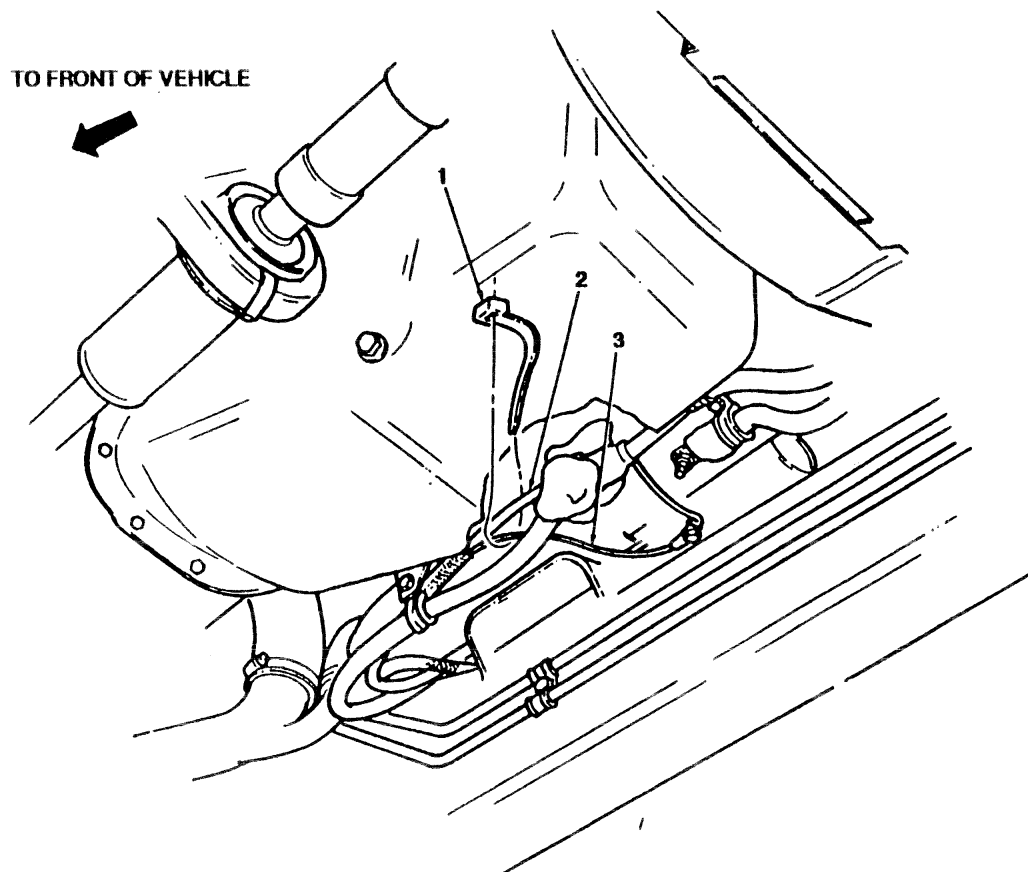


FIGURE 3-9

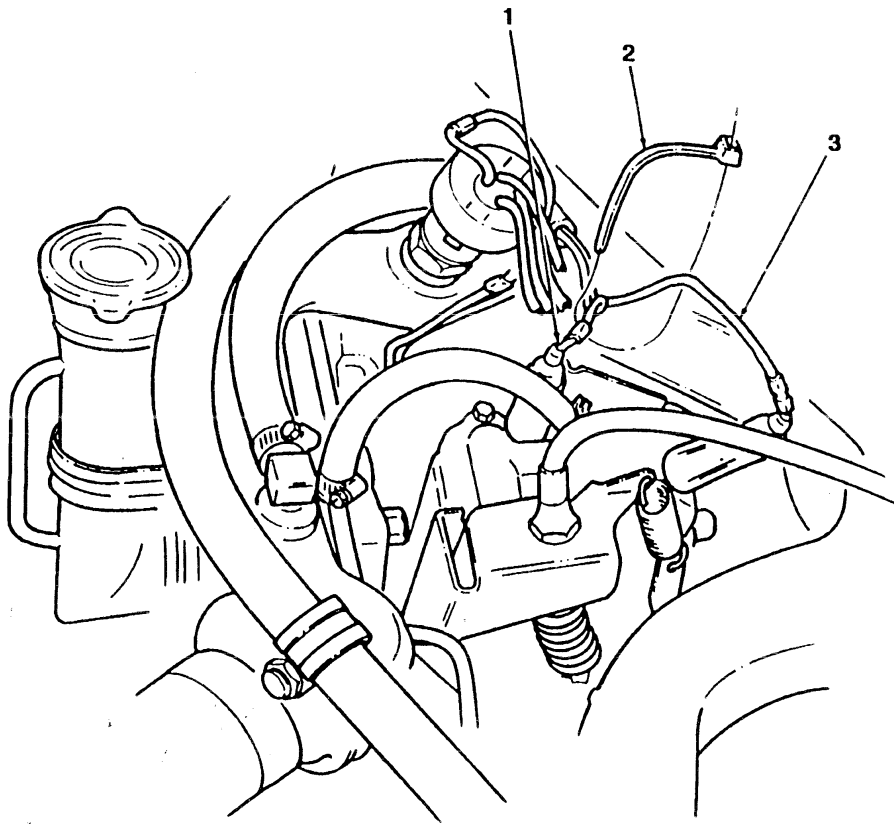


FIGURE 3-10

3-8. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Removing/installing engine assembly from/in shipping and storage container.

POC:

Ms. Patricia Grashik, AMSTA-IM-HLA, DSN 786-7566, Commercial (810) 574-7566

grashikp@cc.tacom.army.mil

DEFICIENCY :

Direct and General Support Units lack technical manual maintenance support for removal and installation of engine assembly from/in shipping and storage container.

COMMENTS:

Procedures have been developed for removing/installing engine assembly from/in a shipping and storage container. This task can be accomplished by using the following parts and instructions:

MATERIALS/PARTS:

NOTE

**Only damaged parts and lock washers require replacement.
Parts are as depicted in figure 3-6.**

<u>ITEM</u>	<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
7	5310-00-809-4061	Washer	8
8	5310-00-637-9541*	Lockwasher	8
9	5305-00-781-3926	Screw	4
11	5330-01-264-6537	Gasket	1
14	5305-00-543-2419	Screw	4
16	5305-00-732-0511	Screw	26
18	5310-00-809-5998	Washer	26
19	5310-00-768-0318	Nut	26

*Mandatory replacement item

3-8. Tact. Trucks cont.

PROCEDURES:

A. Removal of Engine Assembly from Shipping and Storage Container.

1. Press air-release button (1) located at center of breather valve (2) before opening engine container (5). (see figure 3-6)
2. Scribe a reference line (17) on upper container (4) and lower container (13).
3. Remove twenty-six nuts (19), washers (18), and screws (16) securing upper container (4) and lower container (13).
4. Remove upper container (4) from lower container (13).
5. Attach engine lifting sling to engine assembly. (Refer to TM9-2815-237-34.)
6. Remove two screws (14), lockwashers (8), and washers (7) securing left engine mount (12) to engine assembly (6). Discard lockwashers (8).
7. Remove two screws (14), lockwashers (8), and washers (7) securing right engine mount (15) to engine assembly (6). Discard lockwashers (8).
8. Remove four screws (9), lockwashers (8), and washers (7) securing rear engine mount (10) to engine assembly (6). Discard lockwashers (8).
9. Remove engine assembly (6) from lower container (13) and mount engine assembly to repair stand. (Refer to TM9-2815-237-34.)
10. Refer to TB9-289 dated 1 October 1990 for shipping and storage container maintenance.

B. Installation of Engine Assembly in Shipping and Storage Container.

1. Attach engine lifting sling to engine assembly. (Refer to TM9-2815-237-34.)
2. Remove engine assembly from repair stand, if required. (Refer to TM9-2815-237-34.)
3. Position engine assembly (6) in lower container (13). (see figure 3-6)
4. Align holes of rear engine mount (10) to engine assembly (6) and secure with four screws (9), lockwashers (8), and washers (7).
5. Align holes of left engine mount (12) to engine assembly (6) and secure with two screws (14), lockwashers (8), and washers (7).
6. Align holes of right engine mount (15) to engine assembly (6) and secure with two screws (14), lockwashers (8), and washers (7).
7. Remove engine lifting sling from engine assembly. (Refer to TM9-2815-237-34.)
8. Determine serviceability of gasket (11). If unserviceable, replace with NSN 5330-01-264-6537 gasket(II).

3-8. Tact. Trucks cont.

9. Using scribed line marked in paragraph A, step 2 as reference, position upper container (4) to lower container (13). (see figure 3-6)
10. Secure upper container (4) and lower container (13) with existing twenty-six screws (16), washers (18), and nuts (19).

PUBLICATIONS AFFECTED:

TM9-2320-280-34

TM9-2815-237-34

LEVEL OF MAINTENANCE:

Direct and General Support

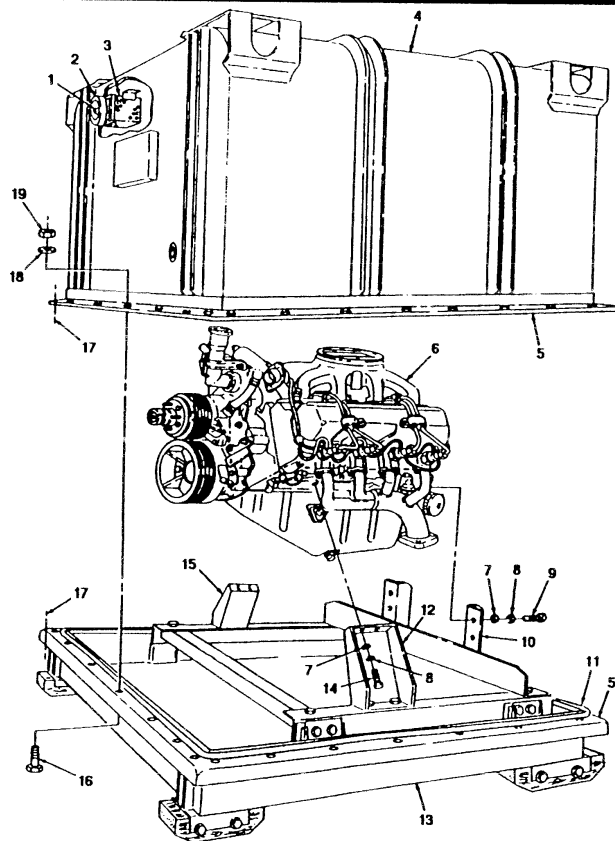


FIGURE 3-6

CUCV, HMMWV...

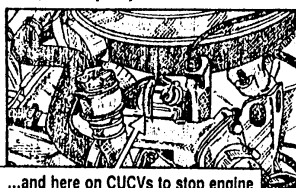
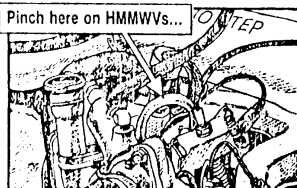
Stop Engine Run-on-on-on-on-on

When switching the ignition off won't stop the engine, you're in a pinch. The solution? Pinch it back.

The quickest cure for a run-on engine is to pinch the fuel return line with your fingers or a pair of pliers.

That stops the flow of fuel, killing the engine.

Then, tell your mechanic. ASAP. He may have to replace a faulty fuel shutoff solenoid or get support to check out the fuel injection pump.



Oil Pan Shroud Now "O"

HMMWVs with arctic heaters will no longer stall unit mechanics who want to pull the engine's starter.

The starter is removed at unit level. But you have to remove the heater's oil pan shroud—a support job—to get to it.

No more. The headshed now says the shroud is removed at unit level, too. Page 3-23 of TB 43-0001-39-8 (Mar 96) has the details.

PS 526

9

SEP 96

CUCV/HMMWV Gasket

Mechanics, you can use either RTV sealant or a ready-made gasket for the CUCV or HMMWV's oil pan or valve covers. Order the oil pan gasket with NSN 5330-01-310-6780. Use NSN 5330-01-372-0636 to get the valve cover gasket. Make a note until the TMs are updated.

Oil Pan NSNs

Rocky terrain can punch holes in the oil pans on Humvees. Then it's time to put on a new one. Pages 3-8 and 3-9 of TM 9-2320-280-20-2 tell how, but the -20P TM doesn't list all the parts.

PART	NSN	UNIT OF ISSUE	NO. NEEDED
Gasket	5330-01-150-7744	EA	1
Oil pan	2815-01-168-7912	EA	1
Bolt	5306-01-230-3354	EA	2
Screw	5305-01-150-9781	EA	20
Stud	5307-01-196-4717	EA	2
Nut	5310-01-158-6257	EA	1
Lockwashers	5310-00-582-5965	HD	2

CUCV/HMMWV

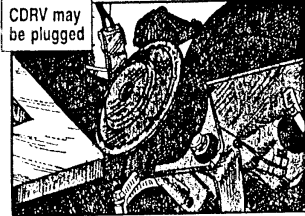
KEEP CRANKCASE VENTED

OOH, I'M ALL STUFFED UP!

HOLMES, WHAT COULD BE AILING THIS VEHICLE?

A clogged crankcase depression regulator valve (CDRV) on your CUCV or HMMWV, or a plugged-up oil filler cap on your CUCV, adds a lot of pressure to the crankcase—enough to cause oil leaks, blown seals and ruined engines.

CDRV may be plugged



You will usually see a clue before clogs blow seals or ruin engines, though. You may find oil on the engine or on the ground if the truck's been running for awhile. The pressure has forced oil past gaskets and seals. A badly plugged valve can even blow out the rear main seal.

You may see black exhaust, too. The pressure has drawn oil from the crankcase and sent it to the intake manifold. If you see any or all of these symptoms, check out the venting system. The CUCV's oil filler cap is easy to test. Just remove it and shake it. If it rattles, it's OK. If it doesn't, replace it. Do this every semi-annual service.

Shake it...If it rattles, you're ready to roll



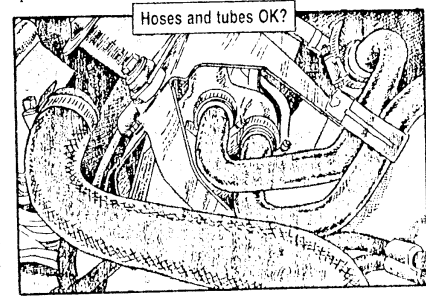
IT'S ELEMENTARY, WATSON, IF YOU LOOK FOR THE PROPER CLUES.

The CDRV doesn't have such an easy test. DS uses a manometer, NSN 6685-00-857-4895, connected to the oil dipstick tube. The pressure reading should be between two and five inches of vacuum at 2,000 RPM.

At unit level, remove the valve and hose and clean them with a rag. If you find oil dripping from inside, replace the CDRV.

Eyeball the hoses and connectors to the valve. A hole in a rubber hose could let in dirt that plugs up the valve. Never clean the oil filler cap or CDRV with solvents or pressurized air. You'll just damage the diaphragm inside. That can give you the very problems you're trying to solve.

Hoses and tubes OK?



PS 504

18

NOV 94

PS 504

19

NOV 94

Get Hot on Cooling PM



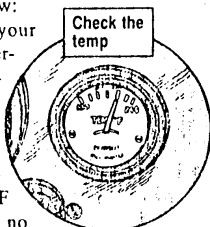
The best time to do your cooling system PM is before cold weather sets in.

Here's how:

Eyeball your engine's operating temperature. A cooling system should be able to reach 160° F to 180° F no matter how cold it is outside. If yours won't, have the thermostat checked. It may be stuck open and need replacing.

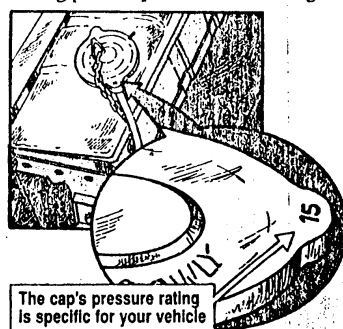
Systems that always run at more than 200° F also need attention. They might have a bad thermostat, a clogged radiator, a bad radiator cap or filthy coolant. The air flow may even be blocked.

Air-cooled systems don't need much attention. They need a good flow of air with all the airflow shrouds in place.



To speed up heating in zero weather, you can partially cover the air intake grills with canvas when starting. Just be sure to take it off after the engine reaches operating temperature.

Look at your radiator cap. It should be the one your TM calls for. Just any cap won't do. The pressure rating of the cap is vital. A rating too low cuts the boiling point of your coolant. A rating



2

NOV 93

too high builds up pressure that'll pop radiator seams or blow hoses.

Hoses need to be touched as well as looked at. They have to withstand heat, pressure and vibration. They're rubber, so they rot, harden and crack with age. Report any bad hoses that you find. Look over the radiator. Look for leaks



on the top tank, front and back of the core, and bottom tank.

Leaks may not show up when the engine's cold. Look for rust or odd-colored dribbles, where coolant has leaked and dried. Later, when you've

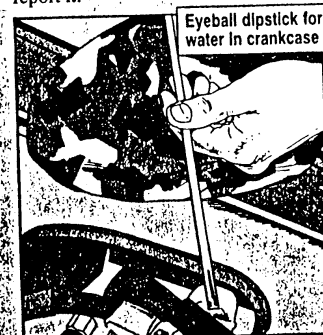
NOV 93

got the engine running at operating temperature and pressure, check those places again for wet spots. Use a flashlight during both inspections.

Finally, take the radiator cap off. If the cooling system is hot, open the filler cap slowly until all pressure is gone. Use a rag or glove to protect your bare hand from the hot cap.

The coolant should at least cover the top of the core. It should be almost clear—it'll be colored by the anti-freeze. If your coolant is muddy-looking or has bits of junk in it, your cooling system needs draining and flushing—maybe even cleaning. Report it.

If you see a rainbow of oil slime on top of the coolant, you've probably got a leak inside your engine. Exhaust gas or oil is getting into your cooling system. Pull the crankcase dipstick and check for water in the oil. Little blobs will show on the dipstick. Either way, report it.



3

Vehicles ...



When you go to the field, be sure you take some drip pans. These pans make changing the oil in your vehicle easier and faster, plus they keep oil spills to a minimum.

There are a couple of drip pans available in the Army supply system. They come with a long handle you can use to push the pan under the vehicle. There are also carrying handles on the pan and a pouring lip to make it easier to dump the old oil in a waste oil container.

PS 521

Here's what you can get:

NSN 4910-00-	Capacity
387-9592	4 gal
287-2944	6 gal

You can also use the empty tray-pack meal trays for drip pans. Field mess teams can clean and save the trays for the maintenance section.

Be sure you dispose of any oil caught in the drip pans in accordance with your local hazardous waste SOP.

10

APR 98

Chapter 03

FUEL SYSTEM

Functional
Group Code
0302-0311

4-4. Tactical Trucks

MODEL:

CUCV/HMMWV Family Of Vehicles

SUBJECT:

Fuel injector pump line nut wrench

POC:

Mr. Darrel DeLamielleure, AMSTA-IM-HLB, DSN 786-6161, Commercial (810) 574-6161
delamied@cc.tacom.army.mil

EDITORS NOTE:

*This is an updated article that supersedes the one published in TB 43-0001-39-1, dated June 96.
The following are the changes that were made:
- new info added to 2nd sentence of Comments*

DEFICIENCY:

CUCV/HMMWV fuel injector lines may require tightening to prevent leaking. It is difficult to get to injector lines on CUCV/HMMWV engines without removing a lot of components first.

COMMENTS:

As a result of an approved Tool Improvement Program (TIPS) suggestion, an injector pump line nut wrench is approved for CUCV/HMMWV vehicles with local commander approval. This tool is a 5/8 inch Hex wrench utilizing standard 3/8 inch drive extensions) in combination with a 3/8 inch Universal swivel attachment, these items are in the Common Number 1 Tool Set. (This Hex wrench is slightly different than what is commonly known by mechanics as a 'crowsfoot.') Units can order this special Stanadyne fuel injection pump tool from Kent-Moore Tools using P/N J28402, CAGE 33287. The cost is \$17.45.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit

4-6. Tactical Trucks

MODEL:

All M998 Series Vehicles

SUBJECT:

Substitute Clamp for Fuel Return Line at the Injector

POC:

Mr. Daniel Dudek, AMSTA-MTA, DSN 786-7416, Commercial (810) 574-7416

DEFICIENCY:

Spring clamps used to secure the fuel return lines at the injector may be out of stock and have long lead times.

CONTENTS:

Spring clamp NSN 4730-00-150-6118, used to secure the fuel return line at the injectors may have a long lead time when they become out of stock. A tie strap NSN 5975-00-903-2284, can be substituted for the spring clamp during periods of non availability. The vehicle is still considered NMC if a class III leak is evident at the tie strap. The spring clamp is still the preferred clamp and should be installed when they become available.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit

4-8. Tactical Trucks

MODEL:

M998 Series HMMWV

SUBJECT:

M998 series vehicles with air cleaner pre-cleaner (NSN 2940-01-302-8028) installed

POC:

Ms. Kathy Catenaro, AMSTA-IM-MTA, DSN 786-7151, Commercial (810) 574-7151
catenark@cc.tacom.army.mil

DEFICIENCY:

Pre-cleaner (NSN 2940-01-302-8028) is being damaged when the hood is raised and lowered.

COMMENTS:

To keep the hood from catching the pre-cleaner you can remove some of the hood material. Here's how we recommend doing this, but keep in mind that these dimensions are approximate and you have to shape this alteration to fit properly. First, decide where the hood is hitting the air cleaner and mark it. From that point measure 1-1/2 inches up (point A) and 1-1/2 inches down the hood (point B). Then, using a flat or half round file, remove 1/4 inch of the hood material between point A and B. (see figure 4-3)

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit

3-10. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Proper Air Cleaner Servicing (Emergency Procedure)

POC:

Mr. Ronald Hanebutt, AMSTA-IM-HLA, DSN 786-5481, Commercial (810) 574-5481

hanebutr@cc.tacom.army.mil

DEFICIENCY:

Reports from the field indicate that some HMMWV users are cleaning the air filter element using the forced air exhaust from the M1 main battle tank.

COMMENTS

1. TACOM does not authorize or recommend the use of the M1's turbine engine exhaust or any other vehicle exhaust systems as a method for cleaning the HMMWV's air filter element. This procedure could present serious safety related problems including injury to personnel. Also, the extreme heat of the various exhaust systems could melt and/or destroy the adhesives used in the filter element.
2. For emergency cleaning, TACOM only authorizes tapping completely around the filter element (1) with your hand to free trapped dirt. (see figure 3-13)



FIGURE 8-13

3. If a filter element requires further cleaning, take it to unit maintenance where they can either use compressed air or a cleaning solution to free oil and debris from the element.

PUBLICATIONS AFFECTED:

TM9-2320-280-10

LEVEL OF MAINTENANCE:

Operator

8-5. Miscellaneous

MODEL:

Miscellaneous Vehicles

SUBJECT:

TACOM Standardizes Air Filter Maintenance

COMMENTS:

Introduction

8-5. Miscellaneous cont.

The Army spends nearly \$5 million annually on air filter elements for TACOM-managed equipment. Over the past two years, we've been looking at how the Army manages that investment. We've explored the economic, environmental, and logistical aspects. We learned that replacing your filter elements instead of cleaning them is the most expensive way to maintain a healthy air intake system; but it is also one of the less risky alternatives. It not only costs the Army \$5 million per year, but it puts tons of non-biodegradable waste into our landfills.

This article will provide you with the basics to make an informed decision regarding air filter maintenance for your unit. There are three other alternatives besides replacing filter elements: manual cleaning, machine cleaning, and contracted cleaning. We don't advocate one method over any other.

Use and trust your restriction indicator

Air filter elements come in various sizes and shapes (i.e., V-pac, rectangular, cylindrical), but they all have an extremely important job: protecting your engine from airborne contaminants.

You can't really tell how efficiently air filters are working by looking at them. So, you should service them only when your restriction indicator shows that they are restricting too much air flow. Each time you open your air intake system you run the risk of letting contaminants into your engine and drastically shortening the life of your engine. Let the restriction indicator do its job. Don't open up the system to see how your filter looks.

If your system doesn't have a restriction indicator, use the time/mileage intervals called out in your Technical Manual (TM). (NOTE: Be aware of specific intervals called for when operating under extreme conditions.) Some systems that don't have restriction indicators are the M973 series, 53MH Sweeper, and the Tampo Model RS-28 Roller.

Prepare for change

8-5. Miscellaneous cont.

Consider the other two alternatives:

- There are commercial vendors that provide air filter cleaning services, check your local phone directory to see what's available in your area. If you elect to use a service to clean your filters, be aware that there are both dry cleaning and wet washing service vendors.
- There's also an air filter cleaning machine (that uses a dry cleaning method) in the supply system. It can clean most of our cylindrical filters, units can order it using NSN 4910-01-381-5426. Operating instructions will be provided with the machine.

Our research with the commercial trucking industry revealed that wet washing is currently the preferred method of the trucking industry. They say that wet washing removes more contaminants than dry cleaning ("dry cleaning" refers to using compressed air, vacuum, vibration, etc., not solvent). Advocates for dry cleaning prefer the dry method; dry cleaning removes contaminants without damaging the filter media.

Here's where you'll really need to weigh your options and check your resources. For example', is water a scarce commodity in your area? If so, maybe a cleaning service or machine is the way to go.

Know your restrictions

Never clean an inner (safety/secondary) element. Replace it at every third cleaning of the outer/primary element.

The Commercial Utility Cargo Vehicles (CUCVS) are equipped with a light duty air filter element that won't stand up to cleaning. Don't even try, just follow the procedures outlined in the CUCV TMs.

There's one other restriction - M1 Abrams Family of Vehicles. Follow the M1 TM cleaning procedures; they're the only ones approved for cleaning M1 V-Pacs.

What to do

No matter which alternative you choose to maintain your air filters, you'll need to follow the following procedures.

Carefully remove primary element from the air cleaner housing. Do not remove secondary element unless you are going to change it. If your system has a secondary element, replace it with a new one every third cleaning of the primary element.

3-1 1. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Use of a substitute fastener (Bolt, Nut and Washer) for the rim clamp used on the HMMWV air cleaner.

POC:

Mr. Eddie Bynum, AMSTA-IM-MTA, DSN 786-8288, Commercial (810) 574-8288
bynume@cc.tacom.army.mil

DEFICIENCY:

The bolt used to fasten the rim clamp may require replacement. We don't provide the bolt separately, so, users must replace the complete rim clamp.

COMMENTS:

A. We've received several suggestions that recommend a replacement bolt. However, we made a decision to develop a new design rim clamp that offers Improved maintainability for the HMMWV air cleaner. The new design is a "no tools needed" over the center clamp. This new clamp allows filter accessibility without the use of tools and promotes proper maintenance. The target date for the new clamp to go in production is Aug 95. We'll provide the National Stock Number (NSN) to the field as it becomes available. The NSN will also be added in a future change to the HMMWV technical manuals.

B. Until the new clamp is available, you can use a substitute Bolt, Nut and Washer as a field expediency. But, please note, the head height on the existing bolt does allow the operator or crew filter access with the adjustable wrench provided in the BII. A substitute bolt will require the use of a socket wrench. Use of a substitute fastener is not mandatory, but used at the commanders discretion, and should only be used until the first chance to replace the clamp. (see figure 3-18)

MATERIALS/PARTS:

Fastener

NOMENCLATURE

NSN

Bolt, Hex	5305-00-782-9489
Washer, Flat	5310-00-080-6004
Nut, Plain, Square	5310-00-010-5606

3-11. Tact. Trucks cont.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit

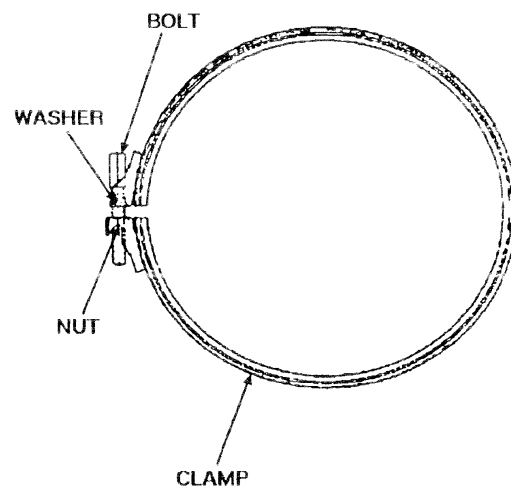


FIGURE 3-18

4-6. Tactical Trucks

MODEL:

M998 Series (HMMWV)

SUBJECT:

Fuel Filler Cap Assembly

POC:

Ms. Kathy Catenaro, AMSTA-IM-MTA, DSN 786-7151, Commercial (810) 574-7151
catenark@cc.tacom.army.mil

DEFICIENCY:

Fuel filler caps get lost because the chain that connects the cap to the filler tube breaks.

CONTENTS:

Based on a SMART Initiative the filler cap chain can be replaced.

PROCEDURES:

1. Remove the filler cap from the filler spout.
2. Pry the link that holds the chain to the cap, and remove the broken chain from the cap.
3. Detach the retaining clip (or spring wire) from the spout and remove the chain. Save the spring wire or retaining clip to install the new chain.
4. Cut an 8" length of chain from bulk NSN 4010-00-958-0633. Hook chain on retaining clip and attach to filler spout.
5. Pry the last link on the opposite end of chain open and attach to plate. Close link.

PUBLICATIONS AFFECTED:

TM9-2320-280-20

TM9-2320-280-34P

LEVEL OF MAINTENANCE:

Unit

8-9. Misc. Vehicles

MODEL:

TACOM Tactical and Combat Equipment

SUBJECT:

Keeping Water out of Fuel Systems

POC:

Ms. Landis Kazsuk, AMSTA-MTA, DSN 786-8288, Commercial (810) 574-8288

DEFICIENCY:

Water in fuel causes problems ranging from microbiological growth, to fuel system corrosion, to fuel line freeze-up during cold weather. These problems all lead to increased maintenance burden, and can all lead to non-operational equipment.

CONTENTS:

A. There are fuel additives designed to combat these deficiencies, but they're intended for use in bulk fuel supplies, so I'm not going to discuss them here. If you, or your Petroleum Officer, need, additional information about these products, please call the POC listed above.

B. The best way to keep your equipment operational is to practice preventive maintenance. Here are some tips you should follow all the time, but especially during cold weather:

- (1) Keep your fuel tanks filled to reduce condensation. Condensation forms inside fuel tanks when temperatures rise and fall.
- (2) Be careful you don't let water and snow fall into your fuel tank while you're refueling.
- (3) Drain your fuel filters and fuel/water separators daily.

C. In addition to the above, there's a product called "Fuel-Dri." Fuel-Dri is a two-piece device consisting of a rigid housing equipped with a tether and a cartridge that contains water absorbing granules. The NSN for this device is 5430-01-350-1446 and the NSN for replacement cartridges is 5430-01-349-8729. We've tested Fuel-Dri; it removes water from fuel and it's authorized for use in the following TACOM Equipment:

M44A2 2 1/2 Ton Tactical Trucks
M39A2 5 Ton Tactical Trucks
M809 5 Ton Tactical Trucks
M939/A1/A2 5 Ton Tactical Trucks

M973/A1, M1065, M1066, M1067 Small Unit Support Vehicle (SUSV)
M911 Heavy Equipment Transporter

D. Specific information identifying the correct tether length, anchoring point, and any special instructions is in the chart below:

FUEL-DRI

<u>VEHICLE SERIES</u>	<u>TETHER LENGTH</u>	<u>ANCHOR POINT</u>	<u>SPECIAL INSTRUCTIONS</u>
M44A2 M939A2 M809	19 inches	Attach the snap swivel on the end of the tether to the second link of the chain closest to the filler neck	Remove the filler neck, attach the tether to the anchor point and drop the FUEL-DRI product into the fuel tank between the filler neck guides.
M939/A1/ A2	13.5 inch or 13.0 inch	Attach the snap on the end of the tether to the S-hook that secures the filler cap chain to the filler neck	Remove the filler neck, using caution to avoid dropping dried sealer material into the fuel tank. Attach the tether to the anchor point and drop the FUEL-DRI product into the tank. Install the filler gasket using a new gasket and thread sealer
<u>VEHICLE SERIES</u>	<u>TETHER LENGTH</u>	<u>ANCHOR POINT</u>	<u>SPECIAL INSTRUCTIONS</u>
M939/A1/ A2 (cont)	13.5 inch or 13.0 inch	strainer. This method can only be used if the S-hook is located approximately in the center of the strainer. Otherwise, weld a small loop or attach an eyebolt near the center of the bottom of the filler neck strainer.	as required. The step over the fuel tank may be removed for easy access to the filler neck. The newer style fuel tanks with angled fuel necks (P/N 12301297 and 12301298) require the 13.0 inch tether. The older style with the vertical filler neck (P/N 11669353 and 11669354) requires a 13.5 inch tether.

VEHICLE SERIES	TETHER LENGTH	ANCHOR POINT	SPECIAL INSTRUCTIONS
SUSV	19 inches	Bottom of the removable filler neck strainer	No special instructions
M911 HET	21 inches	Underside of fuel tank cap.	The driver's side fuel tank doesn't contain fuel system components, but the passenger side tank does. FUEL- DRI can only be used in the driver's side fuel tank. It will remove water from both tanks

E. The Fuel-Dri product is not authorized for use in any other tactical or combat equipment. Engineering evaluation has determined that due to fuel tank configuration, permanently installed filler neck strainers, limited access to lower fuel cells, and the potential for interference with internal fuel level sensing components, other tactical and combat equipment are not suitable candidates for using Fuel-Dri.

F. The evaluation on special purpose vehicles, (i.e., construction and material handling equipment), is not yet complete due to the wide range fielded. I will address this type of equipment in a follow-on article after all engineering evaluation is complete.

PROCEDURES:

A. If you feel you have a problem with water in your fuel, we recommend you consider using the Fuel-Dri product. It's simple to use, monitor, and dispose of.

B. To use this product, follow the chart above and place the cartridge in your vehicles' fuel tank.

C. There's no predetermined change interval, the cartridge should be changed when it's saturated with water. We recommend that you check the cartridge after two or three days when you initially put it in your fuel tank. After that, depending on weather conditions, fuel/water separator output, etc. you should change it only as necessary. Air Force testing indicated that the cartridge can be air dried and reused.

D. You should dispose of used Fuel-Dri cartridges in the same manner that you dispose of used fuel filters.

E. If you'd like additional information, please contact the POC above. Additionally, the manufacturer offers a free demonstration video. Call 1-800-368-3835 for a copy.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

All

4-5. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Lowering the fuel tank level

POC:

Ms. Jody McInerney, AMSTA-IM-MTA, DSN 786-7346, Commercial (810) 574-7346
mcinernj@cc.tacom.army.mil

DEFICIENCY:

The fuel tank levels must be lowered for vehicle transport operations, to compensate for temperatures at different altitudes.

CONTENTS:

The fuel tank drain plug is used to drain the HMMWV fuel tank. However, when the drain plug removal takes place, some spillage will occur while lowering the fuel level. If the unit wants to avoid spillage, they can use hand pump, NSN 4930-00-028-3598, PN (35301) 40 Hand Pump.

PUBLICATIONS AFFECTED:

TM9-2320-280-20-2

LEVEL OF MAINTENANCE:

Unit

MODEL:

HMMWV

SUBJECT:

Glow Plugs

POC:

Ms. Jody McInerney, AMSTA-IM-HLA, DSN 786-5481, Commercial (810) 574-5481
mcinernj@cc.tacom.army.mil

CONTENTS:

Here are some tools you may want to try to remove damaged glow plugs. Your fellow peers fabricated these tools and found them helpful. In the future, any tools fabricated or methods developed for removing damaged glow plugs can be approved at your local commanders discretion.

PROCEDURES:

A. Method One: Remove the injector and attach a piece of wire to the glow plug. Tighten the wire by twisting with pliers (twist pliers available through GSA, NSN 5120-00-305-2306). Hold the wire or tie it to the engine while breaking off the heating element. With the wire attached it is very easy to retrieve the broken/defective heating element.

B. Method Two: Fabricate a removal tool for stubborn glow plugs by using a 10 x 1.00 metric nut and an O-ring (NSN 5330-00-966-8657), see figure 4-2 for instructions. Back the glow plug out of its hole as far as the threads will push it, slip the split nut over the hex end of the plug and down over the threaded portion of the plug. Once in position place a 14 mm wrench on the nut to hold it from turning. Using your 3/8 inch deep socket or end wrench continue unscrewing the plug from the head. In some cases, additional spacers will be needed to completely remove the plug. For spacers use washers that will fit over the hex portion of the glow plug. Place the washers behind the split nut.

C. Method Three: This method involves fabricating a pry or puller tool to help remove swollen glow plugs from the cylinder head and prevent the tip from breaking off. This tool can be made and used by unit personnel. The procedures to use and fabricate the tool can be found in TB 43-0001-39-8, Mar 96.

D. For methods such as using compressed air to expel the damaged tip through the fuel injector nozzle opening; a piece of coil tie wire to prevent the tip from falling into the cylinder when the glow plug is broken off, or removing the cylinder head to gain access to the cylinder see TM9- 2320-280-34, dated Jan 96, paragraph 3-18, page 3-38.

4-9. Tact. Trucks cont.

PUBLICATIONS AFFECTED:

TM9-2320-280-20

TM9-2320-280-34

LEVEL OF MAINTENANCE:

Unit and Direct Support

METHOD TWO FABRICATION INSTRUCTIONS:

1. Cut a slot around the nut wide and deep enough to accept an O-ring.
2. Split the nut across opposing points. This allows for two solid flat sides for the wrench to contact opposite each other.
3. Place the O-ring in the slot created around the nut to hold the two halves together.

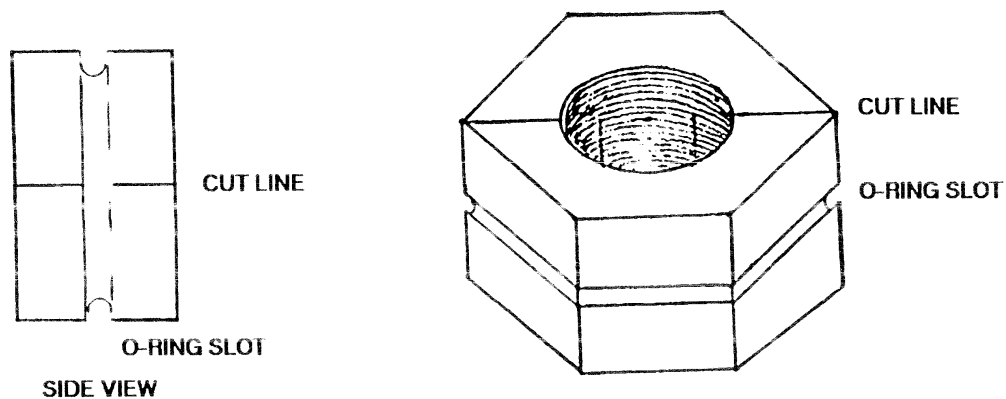


FIGURE 4-2

3-18. Tactical Trucks

MODEL:

HMMWV, M998 Series

SUBJECT:

GLOW PLUGS and Starting Procedures

POC:

Mr. Daniel Dudek, AMSTA-MTA, DSN 786-7416, Commercial (810) 574-7416
dudekd@cc.tacom.army.mil

DEFICIENCY:

Shortcomings with the starting procedures in TM9-2320-280-10 may cause operators to inadvertently fail the glow plugs.

COMMENTS:

- A. When the rotary switch is turned to the run position you start the glow plug controller's pre-glow cycle. This turns the glow plugs on for up to 9 seconds, depending on temperature. Then the glow plug controller continues to cycle the glow plugs with an after glow cycle.
- B. When the wait to start light goes out, you start the engine. If the engine doesn't start, leave the switch in the "RUN" position and wait 10-15 seconds, then try to start the engine again.
- C. If you accidentally turn the switch to "STOP" after an unsuccessful start, wait a minimum of 90 seconds before attempting to start again. This allows the glow plugs to cool enough to prevent superheating the tips.
- D. If you turn the switch to "STOP" and back to "RUN", you start the pre-glow cycle again. If the glow plugs are still hot from the previous pre-glow, the tips will become superheated and burn out.
- E. If your vehicle continues to experience starting difficulty, other problems may exist, such as bad fuel. Get it checked out by your organizational mechanic.

PROCEDURE:

The following notes are being added to paragraph 2-9, Starting the Engine.

3-18. Tact. Trucks cont.

NOTE

Do not leave rotary switch in "RUN" position for extended periods of time. Glow plugs will continue to cycle and batteries will continue to discharge and lead to a no-start condition. Continued attempts to start the vehicle with low batteries could lead to failure of the glow plug system.

Starting the vehicle before the WAIT-TO-START lamp goes out can result in starting problems.

If engine does not start, leave rotary switch in "RUN" position and wait 10 to 15 seconds before trying to restart. Failure to do this will result in damage to the glow plugs or starter.

If you accidentally turn the rotary switch to "ENG STOP" position after an unsuccessful attempt to start, wait 90 seconds before trying to restart. Failure to do this will result in damage to the glow plugs.

PUBLICATIONS AFFECTED:

TM9-2320-280-10

LEVEL OF MAINTENANCE:

Operator

3-8. Tactical Trucks

MODEL:

CUCV/HMMWV

SUBJECT:

Removing Expanded Glow Plugs from the Engine Cylinder Head

POC:

Mr. John Kandrot,
AMSTA-MTA, DSN 786-8288, Commercial (810) 574-8288 kandrotjl@cc.tacom.army.mil

DEFICIENCY:

The CUCV/HMMWV glow plugs swell upon failure and are difficult to remove from the cylinder head.

COMMENTS:

The following procedure can be used to help remove the swollen glow plugs from cylinder heads.

PROCEDURE:

1. Unthread glow plug as far as possible.
2. Attach a pair of vise grips (NSN 5120-00-277-4244) to the glow plug.

WARNING

Exercise caution to prevent screwdriver from slipping and causing injury.

3. Place a large screwdriver (NSN 5120-00-278-1276) between the vise grips and the engine block and pry toward the engine.

NOTE

This will apply outward pressure to the glow plug and help remove the swollen tip without breaking it off inside the cylinder head

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit

3-11. Tactical Trucks

MODEL:

All CUCV (M1008 Series) and HMMWV (M998 Series) Vehicles

SUBJECT:

Removing Pieces of Broken Glow Plugs

POC:

Mr. Daniel Cottone, AMSTA-MTA, DSN 786-7151, Commercial (313) 574-7151

DEFICIENCY:

Pieces of broken glow plugs are difficult to remove from the engine.

COMMENTS:

- A. When the glow plugs in the CUCV or HMMWV fail and swell they cannot be removed in the normal manner. The tip must be separated from the body of the glow plug in order to remove it. Sometimes this causes the glow plug to break into smaller pieces. When this happens the pieces must be picked out with pliers, blown out with air, or the cylinder head must be removed.
- B. As an alternative to using pliers, compressed air, or removing the cylinder head, a shop vacuum may be used to remove the broken pieces. Simply insert one end of a small flexible hose, such as *NSN 4720-01-168-0518*, in to the vacuum hose and seal the connection with tape. Then remove the fuel injector located next to the broken glow plug. Insert the other end of the small hose into the fuel injector opening in the engine and turn on the vacuum cleaner. The pieces of glow plug should empty into the vacuum cleaner compartment for examination.
- C. Some technicians have found this method quick and effective. But if all the pieces do not come out, one of the other methods including removal of the cylinder head must be used.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Direct Support

3-13. Tactical Trucks**MODEL:**

HMMWV

SUBJECT:

Removal of Swollen Glow Plugs

POC:

Ms. Jody McInerney, AMSTA-IM-MTA, DSN 786-7346, Commercial (810) 574-7346
mcinernj@cc.tacom.army.mil

DEFICIENCY:

When the glow plugs swell up they are difficult to remove from the cylinder head and often break and fall into the cylinder requiring removal of the cylinder head.

COMMENTS:

To help remove swollen glow plugs from the cylinder head and prevent the tip from breaking off, a tool can be made and used by unit personnel. This tool is an optional method and can be made as follows:

1. Using 1/8" flat steel, NSN 9515-00-204-3994, and 3/8" round rod, NSN 9510-00-189-0652, welded together, make a tool as shown in Figure 3-20.
2. Be sure that the open end of the fork (dimension F in figure 3-20) is no more than 1 1/32". This can be tested by using an old glow plug as a guide. The forked end must fit behind the hex head of the glow plug. This may require grinding the thickness down from 1/8" to 1/16" to ensure a proper fit.
3. Remove swollen plugs as follows:

Place the fork of the tool behind the hex head of the glow plug with the angle portion against the fuel injector nozzle for leverage. While slowly turning the glow plug out apply slow even outward pressure on the glow plug.

NOTE

Too much pressure or turning the glow plug too fast will result in the tip breaking off and still require removal of the cylinder head

3-13. Tact. Trucks cont.

PUBLICATIONS AFFECTED:
TM9 2320-280-20-2

LEVEL OF MAINTENANCE:
Unit

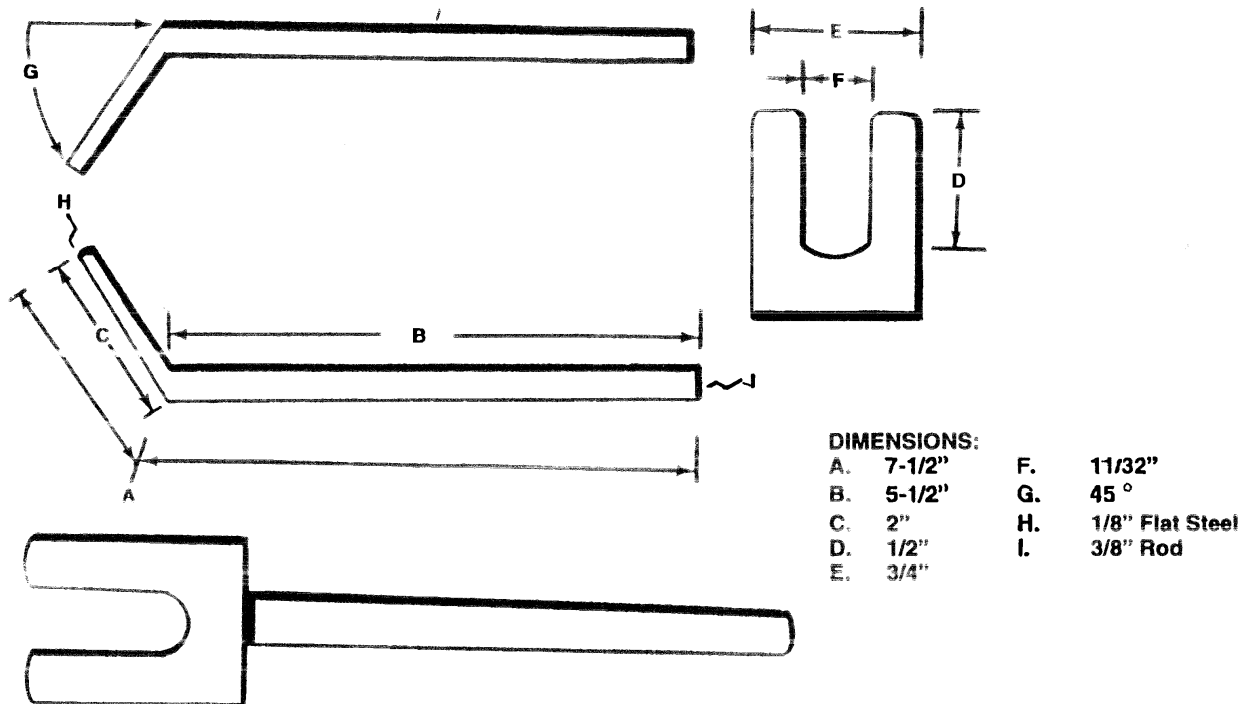


FIGURE 3-20

HMMWV...

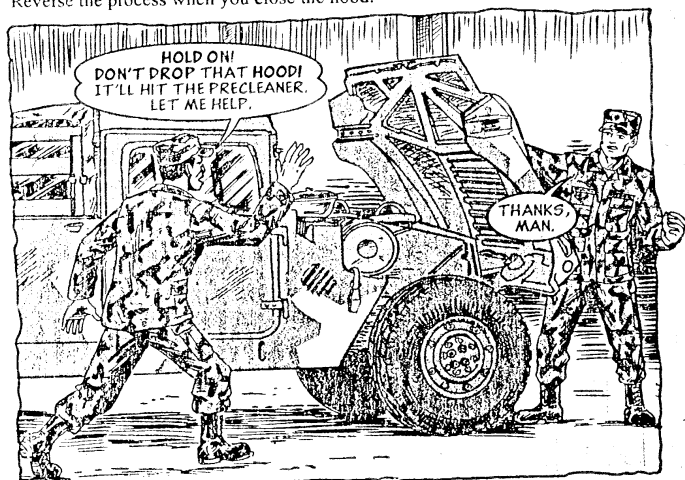
0301

Protect Precleaner and Hood

If you've added the precleaner, NSN 2940-01-302-8028, to your HMMWV's air filtering system, make sure you open and close the hood carefully.

The precleaner is bigger than the air cleaner cap it replaced. The hood can catch on it going up or down.

Open the hood slowly, and get a buddy to push the hood away from the precleaner. Reverse the process when you close the hood.



Clean Housing, Too

0302

When you change a HMMWV's fuel filter, mechanic, clean the inside of the housing before you put in the new element.

A dirty housing undoes all the good done by a clean element. Fuel lines plug up and if the Humvee runs at all, it'll run rough.

When you clean the other metal parts with solvent, wipe the inside of the housing, too.

PS 507



5

FEB 95

HMMWV...

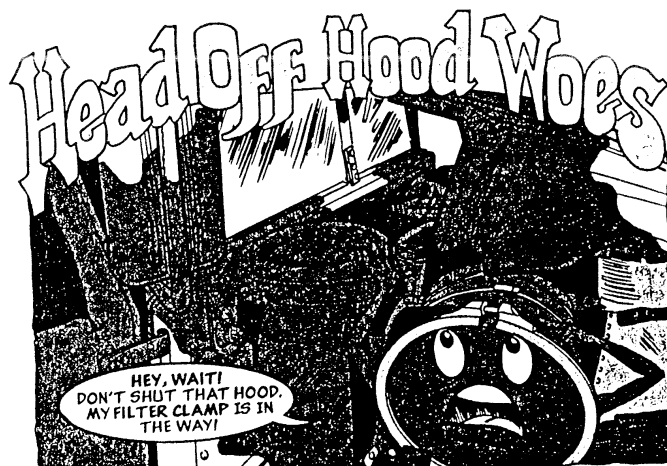
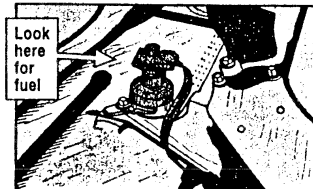
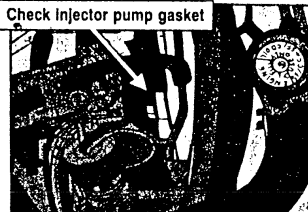
0302

Look for Fuel on the Block

The gasket that fits between your HMMWV's fuel injector pump and the timing gear cover is a known leaker. Your PMCS says to inspect the pump every six months for leaks.

Take that to heart every time you remove the engine access cover. Eye-ball the block valley with a flashlight. See any fuel? If so, have support replace the pump gasket, NSN 5330-01-150-5944.

Check injector pump gasket



That HMMWV air filter clamp bolt can be a real crackup if it's tightened in place on top of the filter.

There's not enough clearance for the hood if the clamp's on top. When you close the hood it hits the bolt and cracks. It cracks some more as the bolt rubs against it.

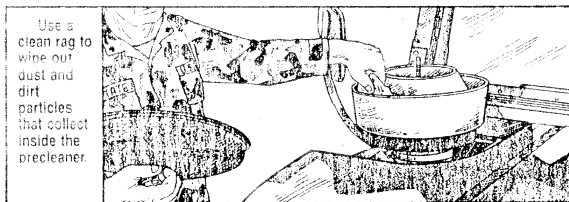
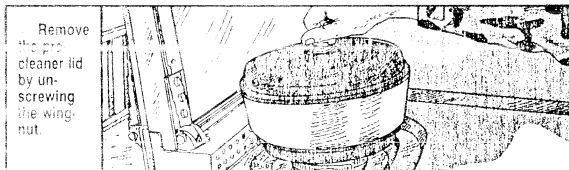
So, instead of tightening the bolt at high noon, tighten the bolt between 3 and 6 o'clock. It's easy to get to there, and safely away from the hood.

Page 03-23



To help put a stop to clogged air cleaner elements, add a precleaner, NSN 2940-01-302-8028, to your Humvee. Units should get their commander's OK before ordering a precleaner.

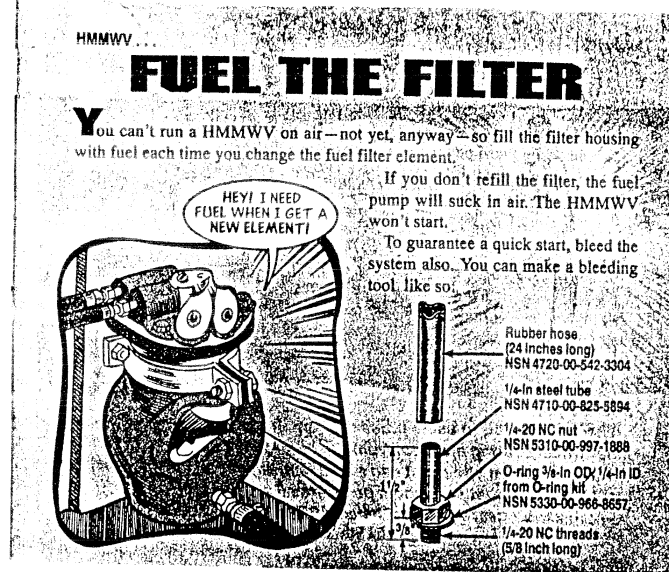
When you see when it's dirty, clean it like so:



PS 497

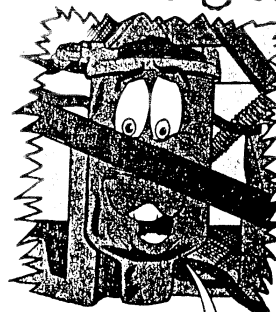
18

APR 94



Diesel Engines ...

Getting Started with JP-8



Mechanics, you've probably heard by now that the military is switching to one fuel. It's true, and JP-8 turbine fuel is the one.

It won't happen overnight but when it does, you can expect a rash of plugged fuel filters. JP-8 is a kerosene-based fuel that breaks gunk and contaminants free from the sides of fuel tanks and lines.

After the switch to JP-8, pay attention to your vehicle's engine. When it starts to run rough, replace all fuel filters. They're clogging up. This clogging should stop after two or three refuellings.

JP-8 won't hurt your engines. And it doesn't need any lubricating help, like engine oil, brake fluid or cherry juice. They plug filters, too, and lower engine performance.

HMMWV...

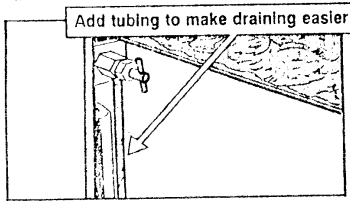
Stopped in Its Tracks

Your HMMWV can be stopped by something as simple as a dirty fuel filter. As dirt clogs the filter, it can't filter fuel properly. Then some dirt gets by to damage things like the injector pump and injectors.

To keep on trucking, just remember to drain the filter during the AFTER-OPERATION check like it says in your -10 PMCS chart.

Draining lets you see what condition the fuel filter is in. If the fuel's not clear after draining a pint, close the valve. Report it to your mechanic.

To make the draining job cleaner and safer, add an 8-in piece of 1/4-in plastic tubing, NSN 4720-00-833-0867. Push the tubing over the end of the drain valve.

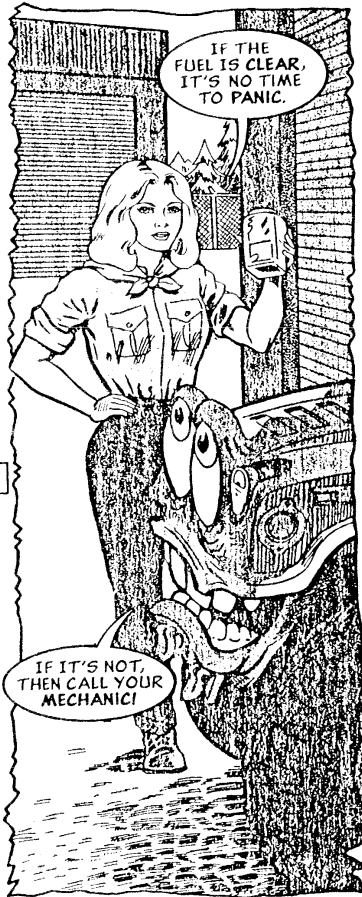


That keeps the fuel from spilling and makes it easier to tell when you're draining clean fuel.

Be sure to put the drained fuel into an approved hazardous waste container. Never dump it down a drain or on the ground.

Also, be sure your mechanic replaces the fuel filter element during every semi-annual service.

PS 511



22

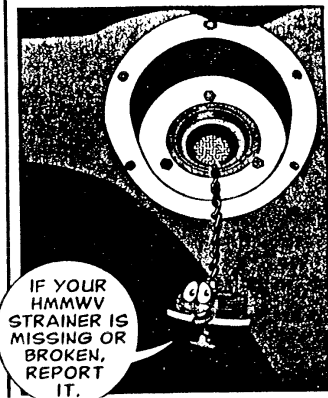
JUN 95

Straining for Fuel

The strainer element in the HMMWV's filler neck is the first line of defense against dirty fuel.

If it's missing or broken, dirty fuel can get into the fuel lines, fouling the fuel filter, injection pump or the fuel injectors. Your HMMWV will run rough, or not at all.

Some filler neck strainers are missing. Others have been broken by pokes with a fuel nozzle. Others have been broken to siphon fuel.



C'MON, NO TIME FOR SLIP-UPS NOW, JACK!



3

HMMWV...

Shaft Tracks on Fuel Tank?



You've probably seen rub marks on a HMMWV's plastic fuel tank, just above the propeller shaft.

What's going on?

Fuel tank strap locknuts and body mount locknuts vibrate loose. When that happens, the straps can loosen, too. The tank then drops down enough that the prop shaft hits it when the truck's traveling over rough terrain.

To stop all this, torque the strap locknuts to 23-27 lb-in and the body mount locknuts to 90 lb-ft. If there's damage to straps or mounts, replace 'em. If the fuel tank is damaged, replace it, too.

You may need to replace the fuel tank vent line filter. A plugged filter can't balance the pressure inside and outside the fuel tank. The expansion and contraction caused by a plugged filter loosens the straps and hardware.

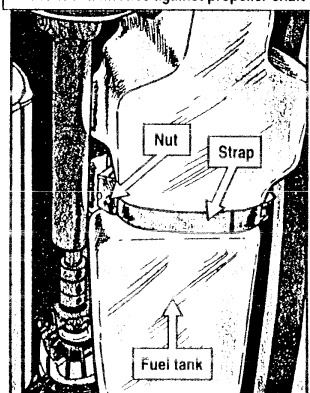
A semiannual PMCS check, with this information, is coming, but don't wait. Use it now.

PS 521

2

APR 96

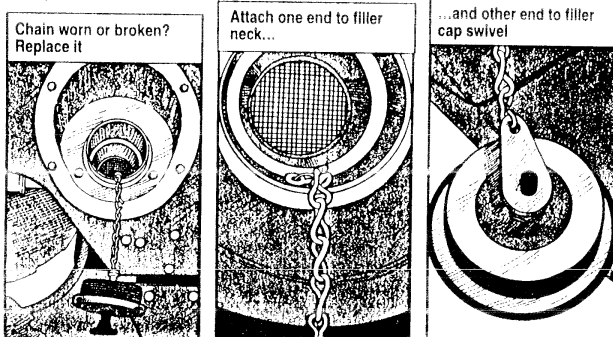
Loose fuel tank rubs against propeller shaft



Sometimes it only takes a little effort and a little money to save a lot. So it is with the fuel filler cap on HMMWVs.

Too many caps are being replaced because the chain connecting the cap to the filler neck breaks. Once the chain breaks, the cap is easily lost.

Save caps by replacing the chain when it breaks or shows wear. NSN 4010-00-958-0633 gets a foot of chain for less than a quarter. Since most units have several HMMWVs, consider ordering plenty of chain. You need eight inches per truck.

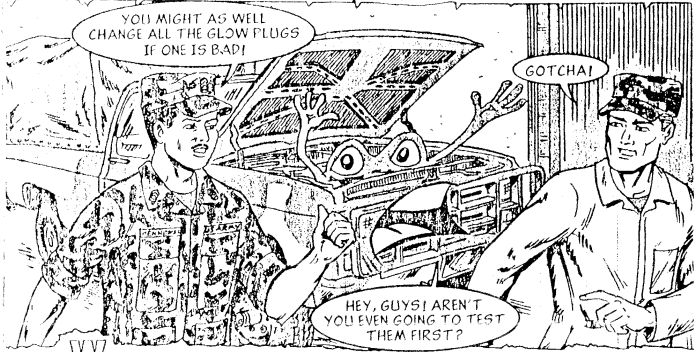


ALL THOSE HMMWVS WERE IN TROUBLE AND YOU'VE BEEN LOOKING FOR YOUR SHADOW?!

YEP, NOW WE KNOW THERE'S SIX MORE WEEKS OF WINTER PM!

CUCV, H?

Check Before You Chuck



When you find a bad glow plug, mechanics, replace it.

But don't assume all the others are bad, and replace them too. You'll be throwing away good plugs.

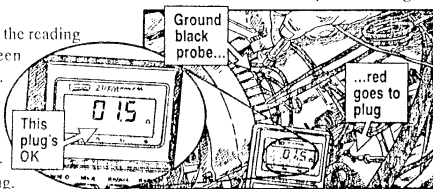
Glow plugs shouldn't fail as a set. If they do, something else is probably wrong... like a controller. And, the old eyeball won't tell you when a plug is getting ready to fail. The only way to know a plug is bad is to test it. All you need is a multimeter.

Disconnect the terminal assembly from each glow plug. Check each plug for looseness or damage. If one is loose, torque it between 8 and 12 lb-ft.

Then, put the black multimeter probe on the frame, and the red probe on the glow plug.

On a HMMWV, the reading should be between one and two ohms.

A good CUCV plug will read one to three ohms. Anything else, replace the glow plug.



These tests should also be done as part of your semiannual services. It's in the CUCV pub on Page 2-13, TM 9-2320-289-20, and on Page 2-7 of the HMMWV's TM 9-2320-280-20-i.

18

SEP 94

Page 03-27

Vacuum Glow Plug Parts

Glow plug parts stuck in the cylinders of your HMMWVs or CUCVs? Use a vacuum cleaner to get them out. Put the hose on the fuel injector ports. TACOM OKs this fix in TB 43-0001-39-7 (Dec 93). Keep in mind, the vacuum may not be able to get out all the parts.

HMMWV, CUCV...

Glow Plug Socket

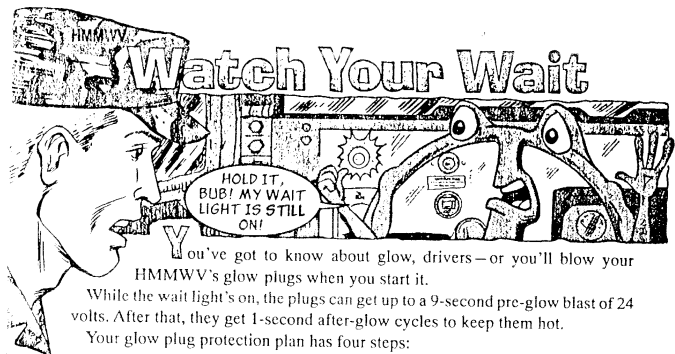
There's no need to bring a socket from home to pull glow plugs from a HMMWV or CUCV, mechanics. You get the $\frac{3}{8}$ -in deep-well socket you need for the job with NSN 5120-00-142-5152.



The socket is part of the HMMWV's organizational special tool kit listed on Page B-20 of TM 9-2320-280-20-3 (Nov 93). The kit is NSN 5180-01-198-7592.

The socket is not yet in CUCV manuals, but is being added to the Common No. 1 shop set.

JAN 95

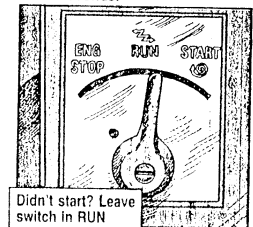


While the wait light's on, the plugs can get up to a 9-second pre-glow blast of 24 volts. After that, they get 1-second after-glow cycles to keep them hot.

Your glow plug protection plan has four steps:

1. Wait for the WAIT light to go out before you try to start the vehicle.
2. Don't hold the switch in START for more than 20 seconds.
3. If your HMMWV doesn't start, leave the switch in RUN and wait 10-15 seconds before trying again.
4. If you turn the rotary switch to ENG STOP, wait 90 seconds before trying to start the Humvee again.

If you don't wait, the glow plug controller, thinking this is a new start, gives the plugs a new pre-glow cycle. Since the plugs are already hot, they'll get hotter, and burn out.



Clean 'em First



PS 524

22

Unless the elements in your vehicle or equipment cannot be cleaned—and your TM will tell you—you're wasting money if you just replace them with new ones every time. Many filter elements can be cleaned three times before they must be replaced.

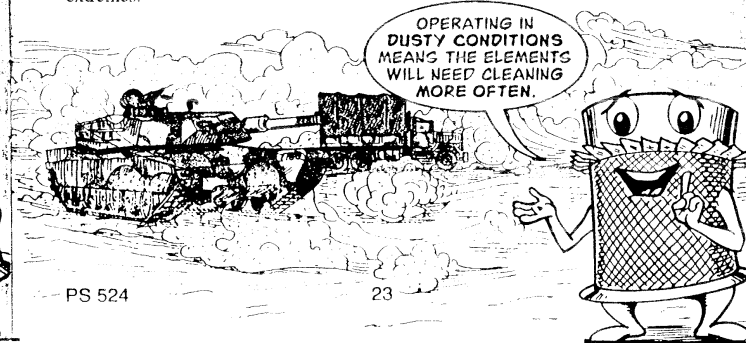
Your unit may not have filter element cleaning machines or use a cleaning service. That's fine. You can still clean 'em with compressed air or with detergent and water. Just follow the specific cleaning instructions in the TM.



WHEELED VEHICLES

Remember that each time you open the air intake system to look at the element, you can damage the element or contaminate the system. So, service them only when restriction indicators show there isn't enough air getting through.

If your vehicle or equipment doesn't have a restriction indicator, use the time or mileage intervals in your TM. Remember, those intervals are affected by extremes.



PS 524

23

HMMWV...

Oil in the Air Cleaner

Mechanics, if you've found transfer case fluid in a HMMWV's air cleaner, you need a larger transfer case vent line.

That old vent line lets pressure build up that can push fluid into the cleaner. It can happen when the outside temperatures hit 80° F and you're driving long distances at 60 mph or faster. The fluid needs to stay in the transfer case to prevent premature wear and filter element damage.

Details on vent line replacements are on Pages 3-26 through 3-36 of TB 43-0001-39-8 (Mar 96). You replace the current vent line with a larger line and add an additional vent line to relieve the pressure.

Get the information from your local TACOM logistics assistance representative or write Hall-Mast.



PS 526

8

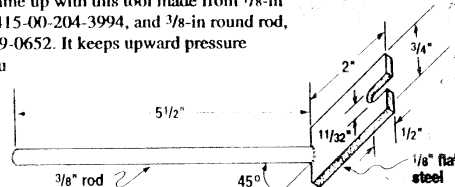
SEP 96

HMMWV...

Glow Plug Removal Tool

Here's a SMART suggestion that may pay off for everybody who has to deal with swollen glow plugs in HMMWVs.

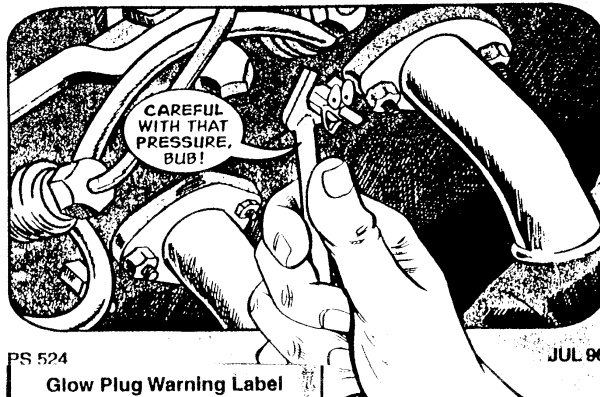
Using the basic idea sent in by SPC Joseph Morris of Ft Wainwright, AK, the truck headshed came up with this tool made from 1/8-in flat steel, NSN 9415-00-204-3994, and 3/8-in round rod, NSN 9510-00-189-0652. It keeps upward pressure on the plug as you slowly turn the plug out.



Be sure when you make the tool that the open end of the fork is no more than 1 1/32 inch wide. Use an old glow plug as a guide. The forked end fits behind the hex head of the plug. If the fit is poor, you may need to grind down the fork end thickness from 1/8 inch to 1/16 inch.

To use the tool, place the fork behind the hexhead of the plug with the angle portion against the fuel injector nozzle for leverage. Slowly turn the plug out while applying steady outward pressure on the plug.

Too much pressure or turning the plug too fast can break the tip. Then, the HMMWV goes to support.



PS 524

JUL 96

Glow Plug Warning Label

NSN 7690-01-267-7370 gets a warning label to stick on the dashboard of a CUCV or HMMWV that reminds drivers to wait until the glow plugs are ready before they try to start the engine. It says: **DO NOT START ENGINE UNTIL THE WAIT LIGHT GOES OUT.**

AUG 96

Chapter 04

EXHAUST SYSTEM

Functional Group Code 0401

3-9. Tactical Trucks

MODEL:
M998 Series HMMWV

SUBJECT:
Exhaust Manifold

POC:
Ms. Leona Milas, AMSTA-IM-HLA, DSN 786-5481, Commercial (810) 574-5481
milasl@cc.tacom.army.mil

COMMENTS:
The level of maintenance to replace the exhaust manifolds on the HMMWV engine is unit maintenance. The procedures to replace the right exhaust manifold and the left exhaust manifold are listed below.

PROCEDURES:
LEFT EXHAUST MANIFOLD REPLACEMENT

WARNING

**Do not touch hot exhaust system components with bare hands.
Severe injury will result.**

a. Removal

1. Remove three locknuts (8), capscrews (11), and washers (9) from crossover pipe (7) and exhaust manifold (4). Discard locknuts (8). (see figure 3-11)

NOTE

Some vehicles may have a socket-head screw in place of stud to secure alternator support bracket and exhaust manifold to cylinder head.

2. Remove locknut (14), washer (15) and alternator support bracket (1) from exhaust manifold (4) and stud (2). Discard locknut (14). (see figure 3-11)
3. Remove stud (2) and washer (3) from exhaust manifold (4) and cylinder head (6).
4. Using hex-head driver, remove seven socket-head screws (12) and washers (13) from exhaust manifold (4) and cylinder head (6).

3-9. Tact. Trucks cont.

WARNING

Vehicles with serial numbers USBL Eff. I through 118767 have manifold gaskets containing asbestos fibers. When performing manifold maintenance, place used gaskets in a plastic, leakproof, sealed bag or container and contact the local health and safety department for further disposal instructions. Failure to observe above warning may result in an environmental hazard.

5. Remove exhaust manifold (4) and gaskets (5) and (10). Discard gaskets. (see figure 3-1 1)

b. Installation

NOTE

Ensure replacement gaskets have a silver, shiny surface, not a dull, dark surface, which is characteristic of a gasket containing asbestos.

1. Install gasket (5) and exhaust manifold (4) on cylinder head (6) with seven washers (13), socket-head screws (12), washer (3), and stud (2). (see figure 3-11)
2. Using hex-head driver, tighten seven socket-head screws (12) and stud (2) to 25- 33 lb-ft (34-45 N•m).
- 3 . Install alternator support bracket (1) on exhaust manifold (4) and stud (2) with washer (15) and locknut (14). Tighten locknut (14) to 31-39 lb-ft (42-53 N•m).
4. Install gasket (10) and crossover pipe (7) on exhaust manifold (4) with washers (9), three capscrews (11), and locknuts (8). Tighten locknuts (8) to 37 lb-ft (50 N•m).

RIGHT EXHAUST MANIFOLD REPLACEMENT

WARNING

Do not touch hot exhaust system components with bare hands. Severe injury will result .

3-9. Tact. Trucks cont.

a. Removal

1. Remove three locknuts (10), capscrews (6), and washers (7) from exhaust manifold (3) and crossover pipe (9). Discard locknuts (10). (see figure 3-12)
2. Using hex-head driver, remove eight socket-head screws (5) and washers (4) from exhaust manifold (3) and cylinder head (1).

WARNING

Vehicles with serial numbers USBL Eff. 1 through 118767 have manifold gaskets containing asbestos fibers. When performing manifold maintenance, place used gaskets in a plastic, leakproof, sealed bag or container and contact the local health and safety department for further disposal instructions. Failure to observe above warning may result in an environmental hazard.

3. Remove exhaust manifold (3) and gaskets (2) and (8). Discard gaskets. (see figure 3-12)

b. Installation

NOTE

Ensure replacement gaskets have a silver, shiny surface, not a dull, dark surface, which is characteristic of a gasket containing asbestos.

1. Install gasket (2) and exhaust manifold (3) to cylinder head (1) with eight socket-head screws (5) and washers (4). Tighten socket-head screws (5) to 25-33 lb-ft (34-45 N•m). (see figure 3-12)
2. Install exhaust manifold (3) to crossover pipe (9) with gasket (8), washers (7), three capscrews (6), and locknut (10). Tighten locknuts (10) to 37 lb-ft (50 N•m).

PUBLICATIONS AFFECTED :

TM9-2320-280-20 TM9-2320-280-24P

LEVEL OF MAINTENANCE :

Unit

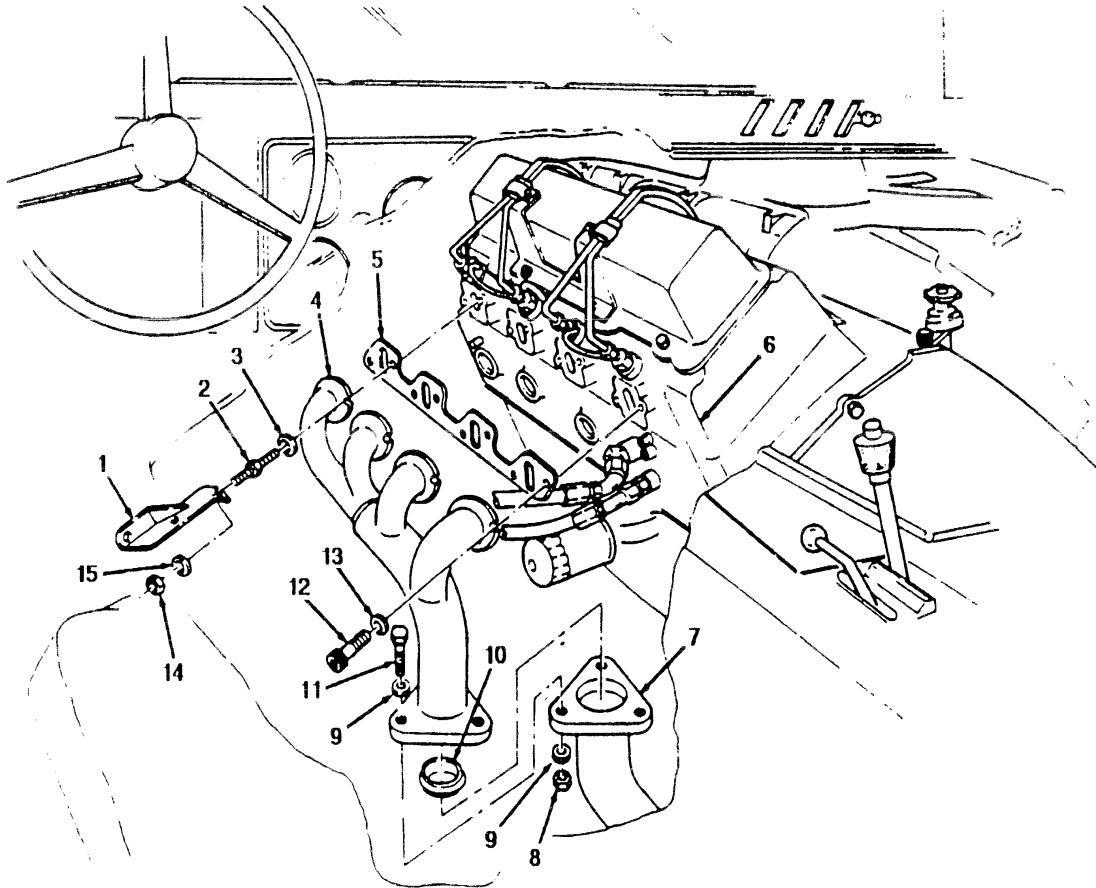


FIGURE 3-11

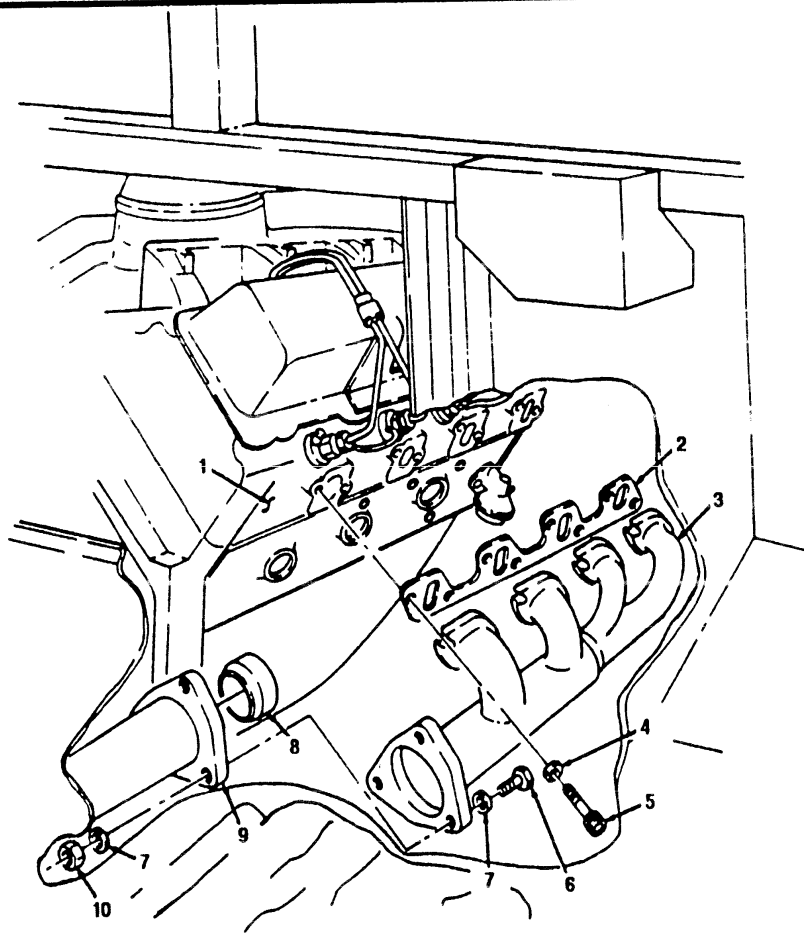


FIGURE 3-12

Exhaust Goes Outside

When you close the doors to your maintenance shop to keep out the cold, you also keep in dangerous exhaust fumes from running vehicles.

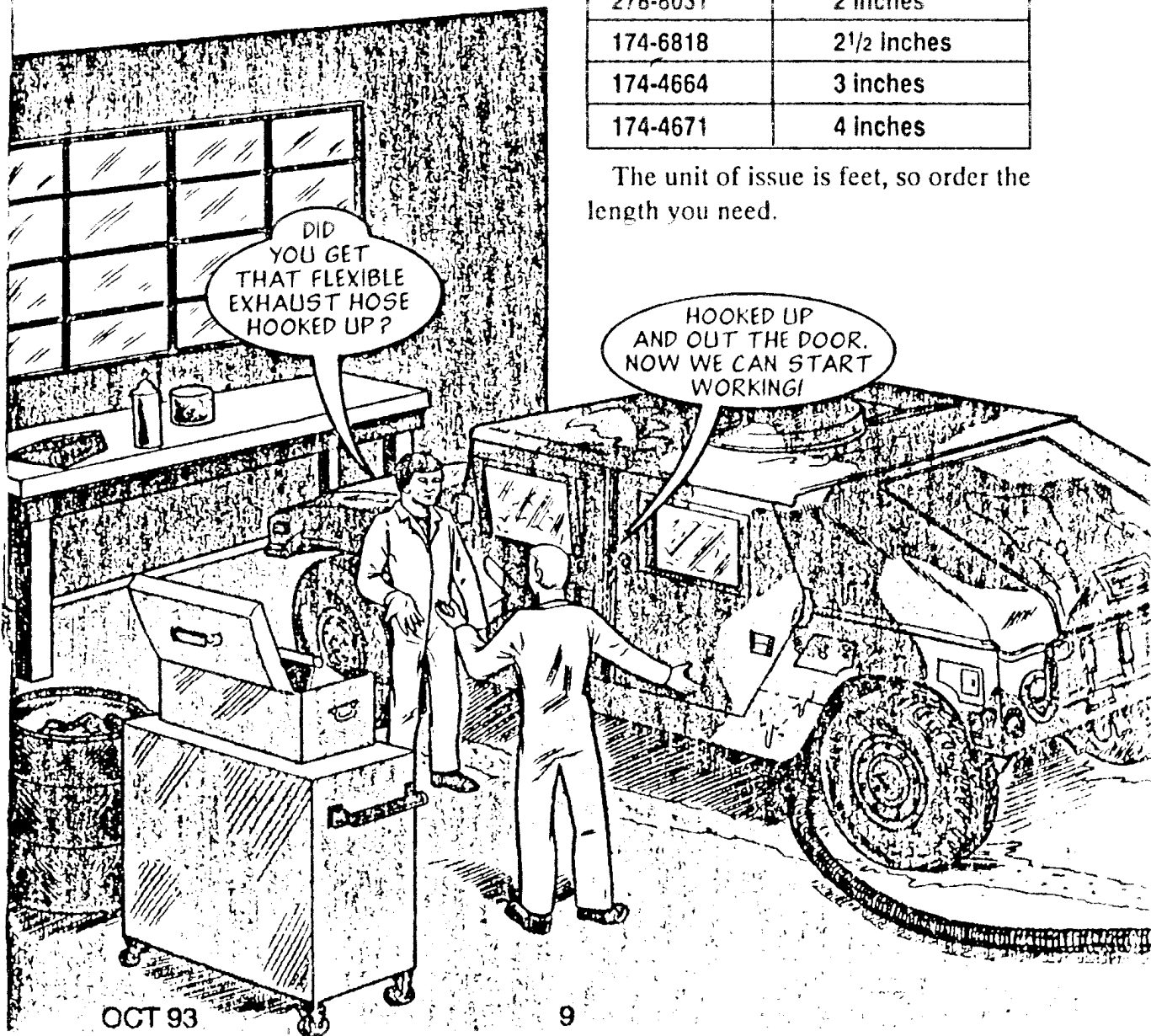
Run that exhaust safely outside by using a flexible exhaust extension.

A snug fit over the exhaust pipe is needed to prevent leaks.

Here is a list of flexible tubes to fit some common-size tailpipes:

NSN 4720-00	Inside Diameter
174-4668	1 Inch
278-8030	1 1/2 Inches
278-8027	1 3/4 Inches
278-8031	2 Inches
174-6818	2 1/2 Inches
174-4664	3 inches
174-4671	4 inches

The unit of issue is feet, so order the length you need.



OCT 93

9

Page 04-06

Chapter 05

COOLING SYSTEM

Functional
Group Code
0501 - 0505

4-8. Tactical Trucks

MODEL:

M998 and M998A1 Series Vehicles

SUBJECT:

Cooling System Surge Tank

POC:

Mr. Keith Barthlow, AMSTA-MTA, DSN 786-8288, Commercial (313) 574-828h

COMMENTS:

A. When stocks are exhausted, the cooling system surge tank, NSN 2930-01-232-9695, P/N 12340062, will be replaced by the surge tank that was previously used only on the M997 and M997A1. The replacing coolant surge tank, NSN 2930-01-256-5350, P/N 12340061 has a 1/2 quart larger capacity and can be used on all HMMWV models.

B. When using the larger surge tank P/N 12340061, the radiator to surge tank hose, NSN 4720-01-196-1636, P/N 12339163 can be used by cutting approximately four inches from the surge tank end of the Hose.

PUBLICATIONS AFFECTED:

TM9-2320-280-20

TM9-2320-280-20P

TM9-2320-280-34P

LEVEL OF MAINTENANCE:

Unit

3-6. Tactical Trucks

MODEL:

M998 and M998AI Series HMMWV

SUBJECT:

Radiator Retaining Strap

POC:

Ms. Leona Milas, AMSTA-IM-MTA, DSN 786-7346, Commercial (810) 574-7346
milasl@cc.tacom.army.mil

DEFICIENCY:

Reports from the field indicate the radiator retaining strap NSN 5340-01-251-0724 has a tendency to come loose and fall off causing the fan to hit and damage the shroud.

COMMENTS:

A procedure has been developed to secure the radiator retaining strap to the fan shroud. A hole is drilled through the radiator retaining strap and fan shroud, and a rivet is installed to secure the radiator retaining strap to the fan shroud. Installation can be accomplished in the field by using the following part and procedure.

MATERIALS/PARTS:

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
5320-00-083-5009	Rivet	1

PROCEDURES:

1. Locate, mark, and drill 0. 129-inch diameter hole (#30 drill bit) in radiator retaining strap (1) and fan shroud (2). (see figure 3-2)
2. Secure NSN 5320-00-083-5009 rivet (3) through fan shroud (2) and radiator retaining strap(1).

PUBLICATIONS AFFECTED:

TM9-2320-280-20 TM9-2320-280-20P/34P

LEVEL OF MAINTENANCE:

Unit

NOTES:

- (1) ALL DIMENSIONS ARE IN INCHES.
- (2) REMOVE ALL BURRS AND SHARP EDGES.

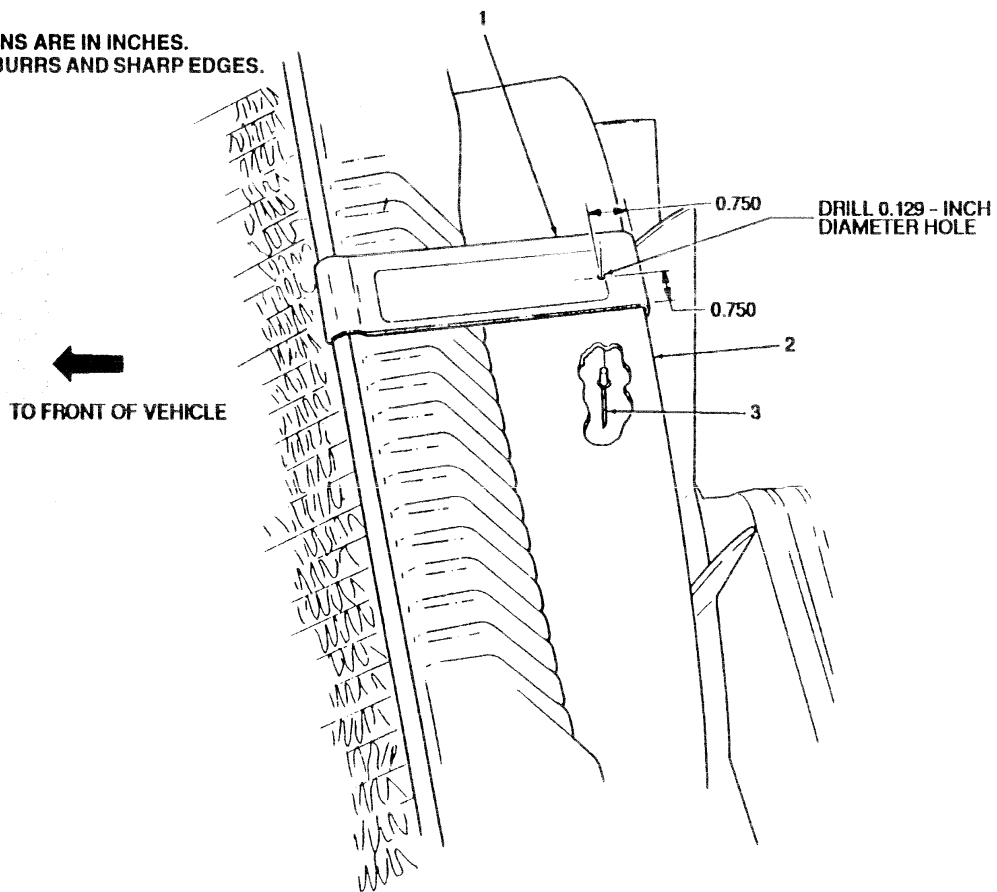


FIGURE 3-2

TB 43-0001-39-2 SEPTEMBER 1996

4-7. Tactical Trucks

MODEL:

XM1109, Up-Armored HMMWV

SUBJECT:

A/C Belt Rubbing Against Coolant Hose

POC:

Ms. Jody McInerney, AMSTA-IM-HIA, DSN 786-5481, Commercial (810) 574-5481
mcinernjCalcc.tacom.army.mil

COMMENTS:

A. We received notice that the XM1109 Uparmored HMMWV A/C belt is rubbing the coolant hose at the water pump (TM9-2320-280-20P, w/change 2, dated Nov 93, Fig 26, Item 8). This creates a hole in the hose, causing coolant loss.

B. To correct the problem, unit maintenance should realign the hose. You can accomplish this by loosening the hose clamp and slightly twisting the hose to provide the clearance needed. Please note, make sure the engine is completely cooled before performing this task.

PUBLICATIONS AFFECTED:

SOMARPI
TM9-2320-280-14&P

LEVEL OF MAINTENANCE:

Unit

3-9. Tactical Trucks

MODEL:

HMMWV with 200 Amp Alternator

SUBJECT:

Radiator Hose to Drive Belt Interference.

POC:

Ms. Patricia Grashik, AMSTA-MTA, DSN 786-7427, Commercial (810) 574-7427
grashik@cc.tacom.army.mil

:

EDITOR'S NOTE

This is a reprint of the same article that was published in TB 43-0001-39-6, dated 30 Sep 93.

- hose clamp NSN has been changed.

DEFICIENCY:

HMMWVs with the 200 amp alternator are experiencing problems with Interference. There is very little clearance between the radiator hose and the V-belts. This condition is causing wear and can result in engine coolant loss.

COMMENTS:

A. Recommend the following adjustment procedure be followed if you are experiencing hose to belt Interference. The procedure will provide an additional 3/8" to 1/2" clearance between the alternator drive belts and the radiator hose:

- (1) Loosen the upper radiator hose clamps.
- (2) Twist the hose counterclockwise by pulling the hose bend elbow upward just until a kink in the hose starts to form.
- (3) Tighten the clamp.

B. Another fix for this problem is to change the hose clamp to a clamp with a metal shield (NSN 4730-01-194-2002). This is the same hose clamp used on the CUCV. It will also prevent damage to the radiator hose.

3- 1 0. Tactical Trucks

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit

MODEL:

HMMWV, M998 Series

SUBJECT:

Fail Drive Quick-disconnect

POC:

Mr. Eric Sutman, AMSTA-MTA, DSN 786-7151, Commercial (810) 574-7151
sutmane@cc.tacom.army.mil

COMMENTS:

Procedures have been developed to install a quick-disconnect between the fan drive and the hydraulic hose for ease of maintenance and decrease maintenance down time during replacement of power steering and alternator belts. Installation of the quick-disconnect can be accomplished in the field using the following parts and materials:

MATERIALS/PARTS

<u>NSN OR P/N</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
4720-01-394-3747	Hose, Non-metallic	1
4730-00-278-3721	Fitting	1
12342947	Quick-Disconnect	1
8030-01 054-0740	Sealing Compound	1

PROCEDURE:

A. Vehicle Preparation.

1. Disconnect battery ground cable. (Refer to TM9-2320-280-20.)

3-10. Tact. Trucks cont.

NOTE

Have container available to catch fluid drainage from hydraulic hoses.

2. Loosen clamp (4) on hydraulic hose (5) and disconnect hose (5) from elbow fitting (1). (see figure 3-14)
3. Disconnect fan drive hydraulic hose (10) from fitting (11).
4. Remove elbow fitting (1) from adapter bushing (8).
5. Remove nut (2), washer (3), and washer (7) securing adapter bushing (8) to fan shroud (6).
6. Remove fan drive hydraulic hose (10) from elbow fitting (9).
7. Remove fitting (11) from fan drive (12).

B. Hydraulic Hose and Quick-Disconnect Installation.

NOTE

Apply NSN 8030-01-054-0740 sealing compound to all pipe threads during installation.

1. Install NSN 4720-01-394-3747 hose (11) on elbow fitting (10). (see figure 3-15)
2. Install P/N 12342947 quick-disconnect (12) on fitting (13).
3. Install fan drive hydraulic hose (11) in quick-disconnect (12).
4. Install NSN 4730-00-278-3721 fitting (13) in fan drive (1).
5. Position existing adapter bushing (9) and washer (8) in fan shroud (7) and secure with existing washer (6) and nut (3).
6. Install existing elbow fitting (2) in adapter bushing (9) on fan shroud (7).
7. Install existing hydraulic hose (5) on elbow fitting (2) and secure with existing clamp (4).
8. Connect battery ground cable. (Refer to TM9 2320-280-20.)
9. Bleed power steering system. (Refer to TM9-2320-280-20.)

PUBLICATIONS AFFECTED:

TM9-2320-280-20

TM9-2320-280-20P

TM9-2320-280-34P

LEVEL OF MAINTENANCE:

Unit

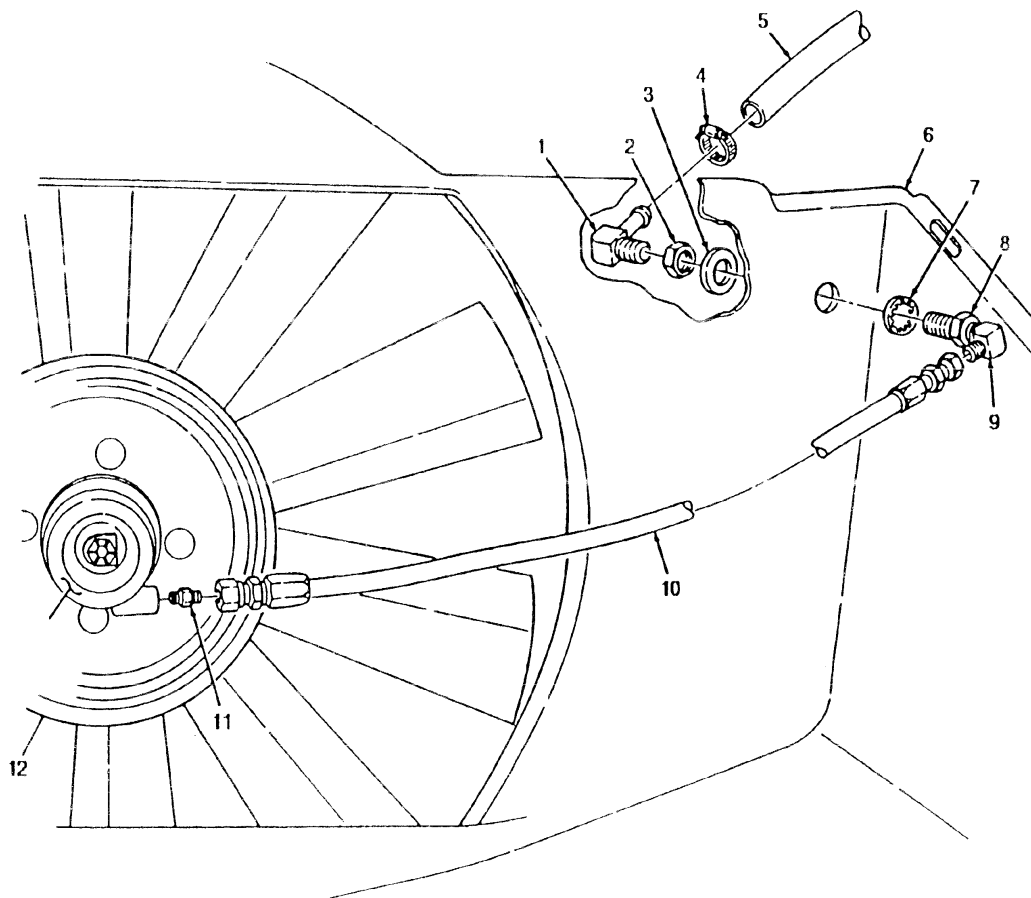


FIGURE 3-14

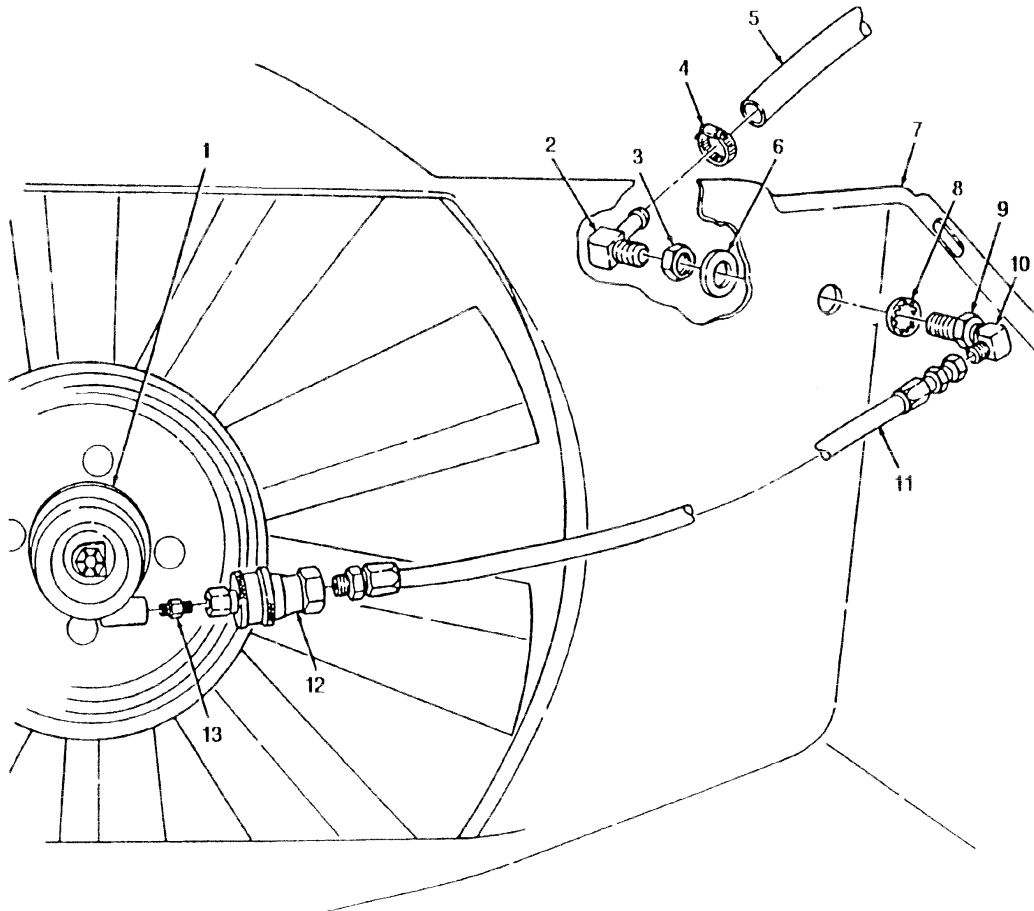


FIGURE 3-15

3-7. Tactical Trucks

MODEL:

M998, M998A1, and M998A2 Series Vehicles

SUBJECT:

Water Pump Replacement

POC:

Ms. Jody McInerney, AMSTA-IM-HLA, DSN 786-5481, Commercial (810) 574-5481
 mcinernj@cc.tacom.army.mil

DEFICIENCY:

A report from the field has requested water pump replacement be moved from direct support level to unit level.

COMMENTS:

A procedure to replace the water pump at the unit level has been developed. The procedure can be accomplished in the field without removing the radiator by using the following instructions and materials.

MATERIALS/PARTS:

NSN	NOMENCLATURE	QTY
2930-01-193-7802	Pump, Cooling System (6.2L engines)	1
5320-01-218-0721	Rivet, Solid	1
5330-01-149-9808	Gasket, Water Pump	1
5310-00-637-9541	Lockwasher	1
8030-01-054-0740	Pipe Sealing Compound	A/R
8030-00-148-9833	Sealing Compound	A/R
8030-01-374-3504	Anaerobic Gasket Sealer	A/R

PROCEDURES:

1. Raise and secure hood. (Refer to TM9-2320-280-10.)
2. Remove battery box cover. (Refer to TM9-2320-280-20.)
3. Disconnect battery ground cables. (Refer to TM9-2320-280-20.)
4. Drain cooling system. (Refer to TM9-2320-280-20.)

3-7. Tact. Trucks cont.

NOTE

Do not remove radiator and shroud called out in equipment condition for step 5.

5. Remove fan blade and fan drive assembly. (Refer to TM9-2320-280-20.)
6. Disconnect fan drive hose. (Refer to TM9-2320-280-20.)
7. Remove alternator drive belt set. (Refer to TM9-2320-280-20.)
8. Remove power steering belt. (Refer to TM9-2320-280-20.)
9. For A2 models, remove serpentine belt. (Refer to TM9-2320-280-20.)
10. Remove water pump pulley. (Refer to TM9-2320-280-20.)
11. For A2 models, remove belt Pensioner, idler pulley, and mount. (Refer to TM9-2320-280-20.)
12. Remove power steering pump support brackets. (Refer to TM9-2320-280-20.)
13. Remove engine oil filler tube. (Refer to TM9-2320-280-20.)
14. Remove heater outlet/inlet hose. (Refer to TM9-2320-280-20.)
15. Remove thermostat bypass hose. (Refer to TM9-2320-280-20.)
16. Remove water pump inlet hose. (Refer to TM9-2320-280-20.)

NOTE

The following steps will be moved to the unit level manual.

17. Remove cap screw (13), lock washer (12), washer (11), and power steering pump bracket (10) from support bracket (9). Discard lock washer (12). (see figure 3-13)
18. Remove two nuts (14) and support bracket (9) from water pump (6).
19. Remove bypass nipple (4) from water crossover (3).
20. Remove two studs (1) and (19), studs (8) and (7), four cap screws (17), washers (18), two cap screws (15), cap screw (16), water pump (6), and adapter plate (5) from timing gear cover (2).
21. Remove seven cap screws (21), adapter plate (5), and gasket (20) from water pump (6). Discard gasket(20).
22. Clean remaining gasket material and sealing compound from sealing surfaces on adapter plate (5), water pump (6), and timing gear cover (2).
23. Remove heater hose nipple (23), elbow (22), and bypass hose adapter (24) from water pump (6).

3-7. Tact. Trucks cont.

CAUTION

Ensure water pump P/N 23500085 is used on 6.5L engines or damage to equipment will result.

24. Install gasket (6) and water pump (5) on adapter (7) with seven capscrews (8). (see figure 3-14)
Tighten capscrews (8) to 13-20 lb-ft (18-27 N•m).

NOTE

Perform step 25 if a new water pump is being installed.

25. Apply sealing compound to rivet (3) and install in water pump (5). (see figure 3-14)
26. Apply anaerobic gasket sealer to sealing surfaces on adapter plate (7), following diagram.
27. Apply pipe sealing compound to capscrew (22).
28. Install adapter plate (7) and water pump (5) on timing gear cover (10) with two long studs (25), stud (14), stud with thick hex (13), and capscrew (22).
29. Install two capscrews (21), studs (9), four capscrews (23), and washers (24). Tighten studs (9) and capscrews (21) and (23) to 13-20 lb-ft (18-27 N•m). Tighten studs (25), (14) and (13), and capscrew (22) to 25-37 lb-ft (34-50 N•m).
30. Apply pipe sealing compound to elbow (1), heater hose nipple (2), and bypass hose adapter (4) threads and install in water pump (5).
31. Apply sealing compound to threads of studs (14) and (13).
32. Coat threads of bypass nipple (12) with pipe sealing compound and install in water crossover (11).
33. Install support bracket (15) on water pump (5) with two nuts (20).
34. Install lockwasher (18), washer (17), and screw (19) through power steering bracket (16) and into support bracket (15). Do not tighten.
35. Install components removed in steps 1 through 16 in reverse order of removal.
36. After installation, adjust belts. (Refer to TM9-2320-280-20.)

PUBLICATIONS AFFECTED:

TM9-2320-237-34P
TM9-2320-280-20
TM9-2320-280-24P
TM9-2320-280-34

3-7. Tact. Trucks cont.

LEVEL OF MAINTENANCE:
Unit

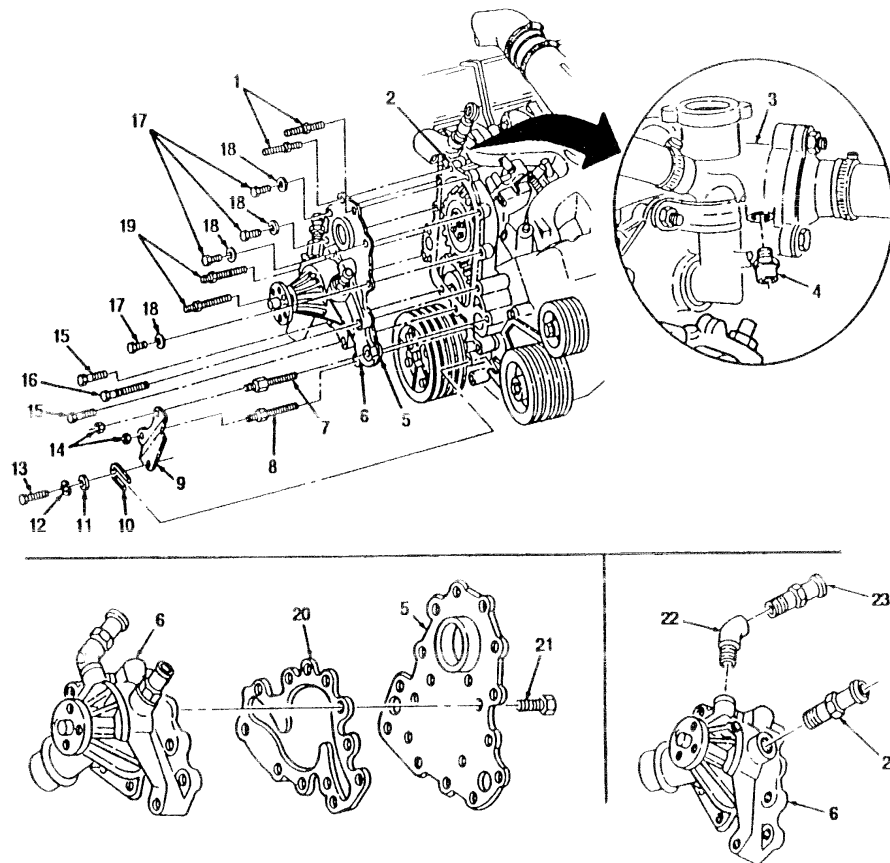


FIGURE 3-13

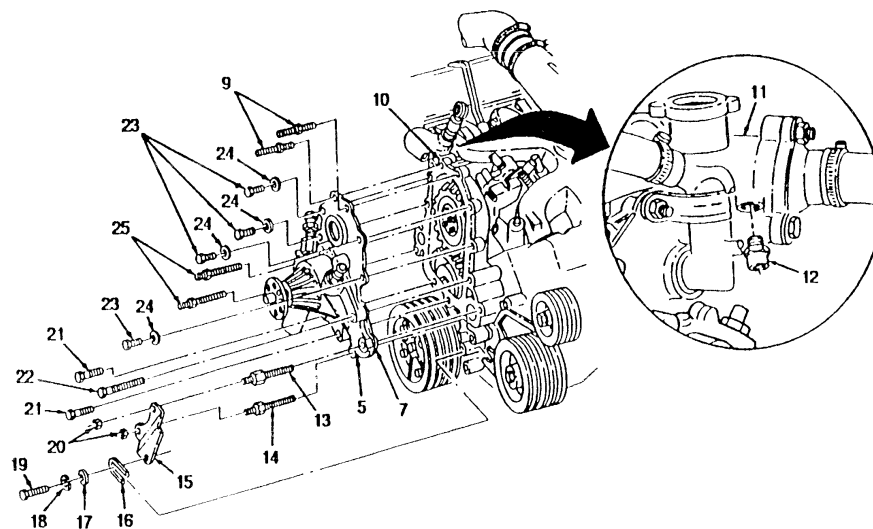
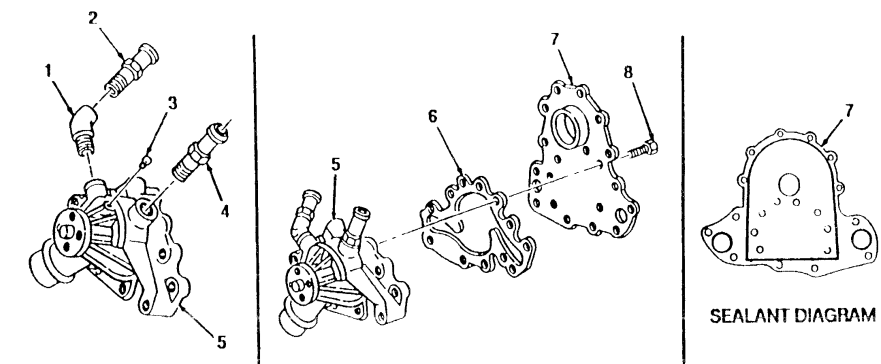


FIGURE 3-14

3-15. Tactical Trucks**MODEL:**

M998 Series

SUBJECT:

Fan Clutch

POC:

Mr. Eric Sutman, AMSTA-MTA, (810) 574-7151

DEFICIENCY:

When the HMMWV is parked or stored for long periods, minor corrosion can cause the fan clutch to lock up. This corrosion isn't severe enough to damage the clutch but it can keep it from operating properly. To free up the clutch you have to disassemble the engine cooling system and remove the clutch.

COMMENTS:

We've adopted a suggestion to apply air pressure to the clutch to disengage it, and then tap on the clutch with a soft faced hammer to free it up.

MATERIALS:

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QUANTITY</u>
4730-00-142-1958	Coupling half, Quick-disconnect	1
4730-01-242-7738	Connector	1
4730-00-223-9255	Coupling, Pipe	1

PROCEDURE:

- A. Disconnect battery ground cable. (Refer to TM 9-2320-280-20).
- B. Assemble NSN 4730-00-142-1958 quick disconnect (3), NSN 4730-00-223-9255 pipe coupling (2), and NSN 4730-01-242-7738 connector (1). (see figure 3-9)
- C. Loosen clamp (2) and remove hose (1) from fitting (3). (see figure 3-8)

3-15. Tact. Trucks cont.

- D. Install connector (1) to hose (5) and secure with clamp (4). (see figure 3-9)
- E. Apply 90 to 120 psi (620 to 827 kPa) air pressure to quick disconnect to disengage the fan clutch.
- F. Tap on fan clutch with a soft faced hammer (like NSN 5120-01-065-9037). The clutch should free up and fan will free wheel.

NOTE

If the fan doesn't free wheel the clutch is still locked. If these procedures won't free up the fan clutch, remove it (Refer to TM 9-2320-280-20) and send it to DS for repair.

- G. Release air pressure from quick disconnect.
- H. Loosen clamp)(4)and remove connector-(1)from hose(5).(see figure 3-9)
- I. Connect hose (1) to fitting (3) and secure with existing clamp (2). (see figure 3-8)
- J. Connect battery ground cable. (Refer to TM 9-2320-280-20)
- K. Bleed power steering system. (Refer to TM 9-2320-280-20)

PUBLICATIONS AFFECTED:

TM9-2320- 280-20

LEVEL OF MAINTENANCE:

Unit

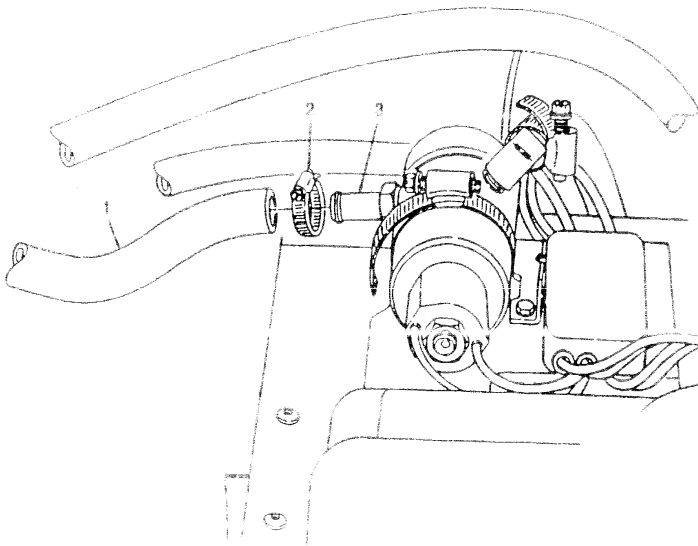


FIGURE 3-8

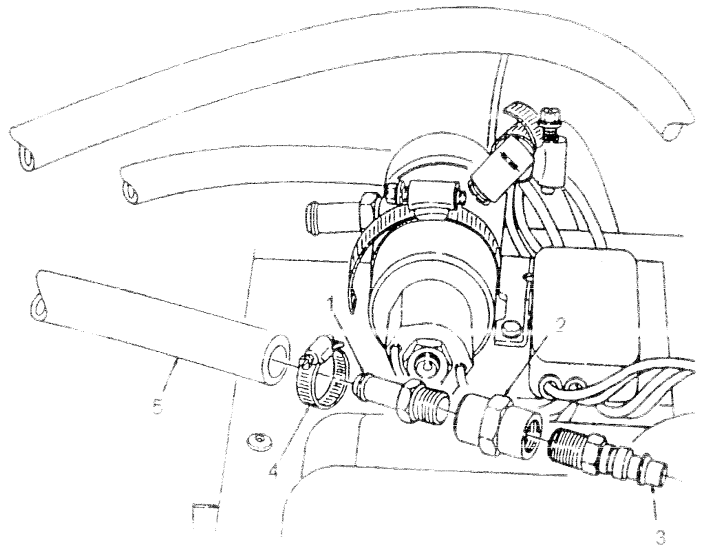


FIGURE 3-9

3-33. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Fan Clutch Cylinder Dust Seal.

POC:

Mr. Eric Sutman, AMSTA-MTA, DSN 786-7151

DEFICIENCY:

There are no replacement procedures for the fan clutch cylinder dust seal, the housing assembly rear grease seal, or the housing assembly needle bearings. If the dust seal is damaged, you must replace the cylinder. If the rear grease seal or needle bearings are damaged you must replace the fan drive.

COMMENTS:

A. Replacement of the grease seal and needle bearings is impractical. If the bearings or seal is damaged, chances are good that debris has also damaged the housing. Because of this, the grease seal and needle bearings will remain non-replaceable items. Do not remove them. Clean the area and inspect the seal and bearings for damage. If either are damaged, replace the fan drive.

B. The dust seal, however, is now available for replacement. We are providing the following procedures for replacement of the dust seal. It is important to realize that a damaged dust seal will not immediately cause the clutch to leak. It only keeps dirt and debris from entering the clutch. Replace the dust seal only if it is cracked or if pieces are missing from it.

C. The dust seal does not yet have an NSN. Until it does, order the seal using a part number requisition on DD Form 1348-6.

MATERIALS:

Lock -nut	NSN 5310-01-194-0481
"O" Ring	NSN 5330-01-192-8892
Dust Seal	P/N (51377) 3018-01339-01

3-33. Tactical Trucks cont.

PROCEDURE

NOTE

For complete disassembly and repair of the fan clutch refer to TM9-2815-237-34.

A. Disassembly

- (1) Remove locknut (1) and tabwasher (2). Discard locknut (1). (see figure 3-80)
- (2) Remove cylinder (3) from fan clutch (6).

NOTE

Remove the dust seal only if it is cracked or if pieces are missing from it.

- (3) Remove dust seat (5) from cylinder (3). Discard dust seat (5). (see figure 3-80)
- (4) Remove "O" ring (4) from inside cylinder (3). Discard "O" ring (4).

B. Inspection

- (1) Inspect cylinder (3) for damage. Replace if damaged.
- (2) Inspect dust seal (5) for cracks in the seal or pieces missing from it. Replace if the seal is cracked or if pieces are missing from it.

C. Assembly

- (1) Install "O" ring (4) in groove inside cylinder (3).

NOTE

Remove the dust seal only if it is cracked or if pieces are missing from it. Make sure lip of seal is facing out.

- (2) Install dust seal (5) in cylinder (3). (see figure 3-80)
- (3) Install cylinder (3) on fan clutch (6).
- (4) Secure cylinder (3) to fan clutch (6) with tab washer (2) and locknut (1). Tighten locknut (1) to 96 lb-in. (10 N•m).

**3-33. Tactical Trucks
cont.**

PUBLICATIONS AFFECTED:
TM9-2815-237-34

LEVEL OF MAINTENANCE:
Direct Support

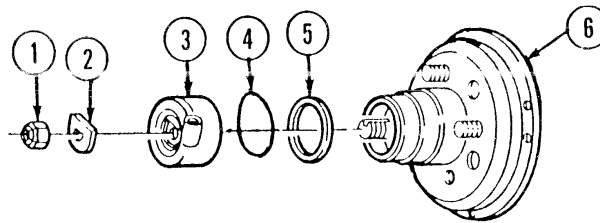


FIGURE 3-80

3-9. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Fan Drive and Fan Blade Replacement

POC:

Ms. Jody McInerney, AMSTA-IM-MTA, DSN 786-7346, Commercial (810) 574-7346
mcinernj@cc.tacom.army.mfl

COMMENTS:

A. It's been brought to our attention that the fan drive and fan blade can be removed as an assembly with the radiator and fan shroud in-vehicle. This will save units repair time, improve your vehicle readiness and help alleviate any work overload at unit maintenance.

B. Below is the new procedure. It eliminates the task to remove radiator and fan shroud before beginning the task. Helpful Note: The fan drive hose may be modified to add a quick-disconnect at commander's discretion. Refer to TB43-0001-39-3, Dec 94. This will make it easier to apply compressed air to disengage fan drive clutch if necessary.

PROCEDURES:

Initial Setup:

Special Tools

Hex Head driver, 8mm
(Appendix B, Item 119)

Manual References

TM9-2320-280-20P

Materials/Parts

Four lock washers (Appendix G, Item 108)
Sealing compound (Appendix C, Item 43)

Equipment Condition

Hood raised and secured (TM9-2320-280-10)

a. Removal

1. Disconnect fan drive hose (1) from fan drive (2). (see figure 3-5)

3-9. Tact. Trucks cont.

NOTE

Mark position of fan blade for Installation.

It may be necessary to apply compressed air to clutch adapter. This disengages fan drive clutch to allow access to socket head screws.

2. Using hex head driver, remove four socket-head screws (3) and fan drive assembly (5) from water pump pulley (4). (see figure 3-5)
3. Remove four nuts (7), lockwashers (8) and fan blade (9) from fan drive (10). Discard lockwashers (8).

b. Inspection

Inspect clutch adapter (6) and fan blade (9) for damaged threads, cracks, bent blades, or breaks. Replace if defective.

c. Installation

1. Align fan blade (9) onto fan drive (10) with four lockwashers (8) and nuts (9). Tighten nuts to 26 lb-ft (35 N•m).
2. Apply sealing compound to four socket-head screws (3) and install fan drive assembly (5) to water pump (4). Tighten socket-head screws (3) to 45 lb-ft (61 N•m).
3. Connect fan drive hose (1) to fan drive (2).

FOLLOW-ON TASK:

Lower and secure hood (TM9-2320-280-10)
Bleed power steering system (para, 8-24)

PUBLICATIONS AFFECTED:

TM9-2320-280-20-2

LEVEL OF MAINTENANCE:

Unit

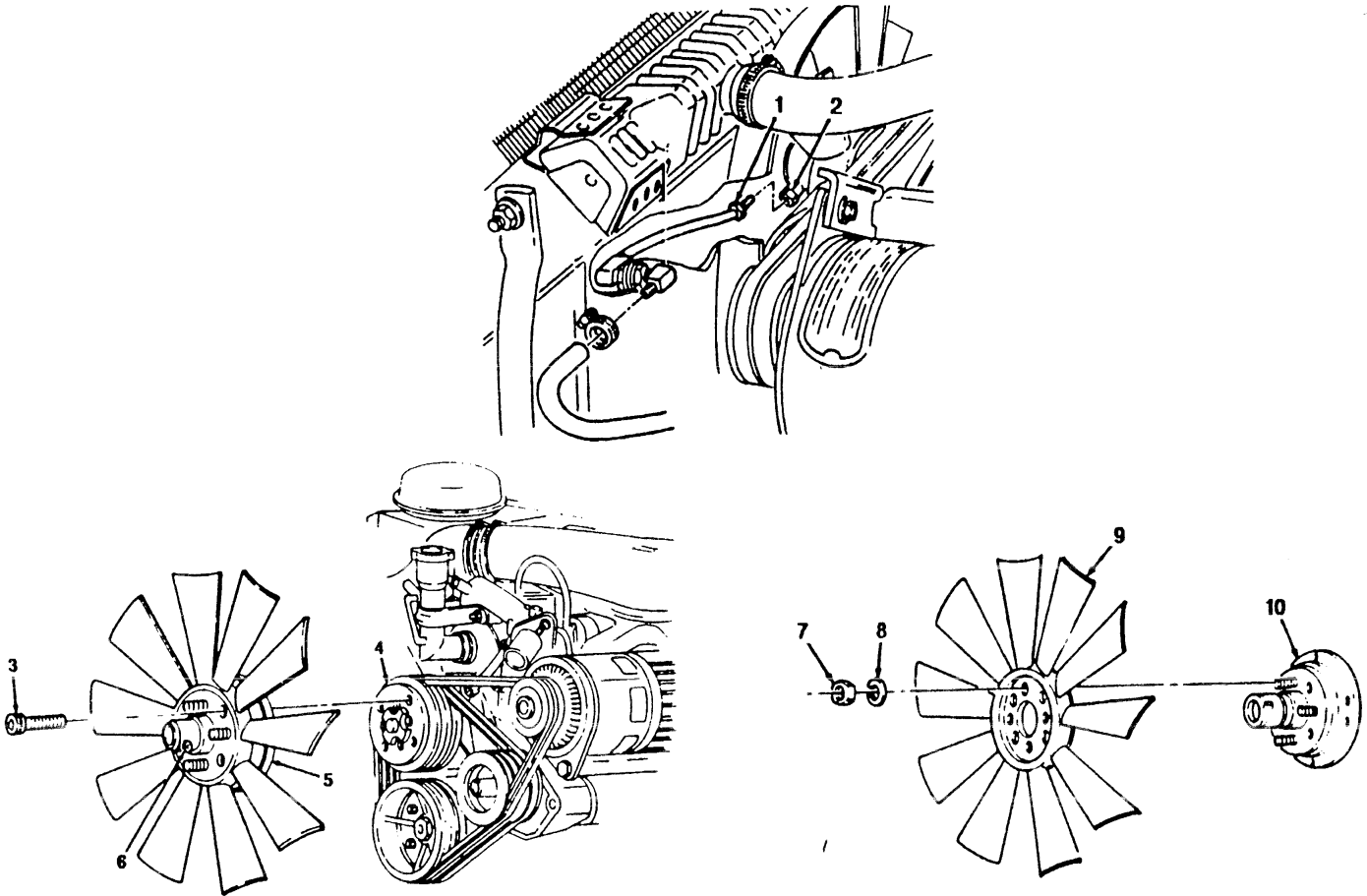


FIGURE 3-5

3-6. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Fan Failures

POC:

Ms. Patti Grashik, AMSTA-IM-MTA, DSN 786-7713, Commercial (810) 574-7713
grashikp@cc.tacom.army.mil

DEFICIENCY:

Field is reporting fan and fan shroud cracks.

COMMENTS:

A. Excessive entry speed during fording operations can cause the fan to crack. Ensure procedures in TM9-2320-280-10, paragraphs 2-29 and 2-30, are followed to prevent vehicle damage during fording operation. Vehicle speed should not exceed 5 mph (8 kph) during fording operation.

B. Ensure proper fan shroud clearance is maintained. Fan blade to fan shroud clearance must be at least 1/4 Inch at any position (TM9-2320-280-20-2, dated Jan 90, with Change 4. paragraph 3-56).

C. Minor fan shroud breaks and cracks can be repaired using fiberglass repair kit NSN 2090-00-372-6064. Use the repair kit only if the repairs can be made while the shroud is installed on the vehicle. The low cost of the fan shroud makes it impractical to remove the shroud for repair. If the fan shroud is damaged such that it must be removed from the vehicle, the shroud should be replaced.

D. When making the repair, place the patch on the exterior of the shroud, making sure that it does not interfere with the fan to shroud clearance. Instructions for use of the repair kit are included with the kit. General information concerning fiberglass repair can be found in TO 9-510, Metal Body Repair and Related Operations.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit

3-14. Tactical Trucks

MODEL:

M998 Series

SUBJECT:

Replacement of Fan Drive Friction Lining

POC:

Mr. Eric Sutman, AMSTA-MTA, DSN 786-7151, Commercial (313) 574-7151

EDITORS NOTE

This is an updated article that supersedes the one published in TB 43-0001-39-5, dated 2 Jul 93. The following are the changes that were made:

- new NSN for Lining, friction*
- two fan drive retaining plate Warnings were deleted*
- second psi Note was deleted*
- TM9-2815-237-34 was added to Pubs. Affect.*
- Direct Support added to Level of Maint.*
- torque requirement deleted from step H.*

DEFICIENCY:

Units lack technical maintenance support for replacing friction lining in fan drive while installed on engine.

COMMENTS:

Procedures have been developed to replace the fan drive friction lining. This procedure can be accomplished in the field by using the following parts and materials:

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QUANTITY</u>
4730-00-142-1958	Coupling half, quick-disconnect	1
4730-01-242-7738	Connector	1
4730-00-223-9255	Coupling, pipe	1
2930-01-189-8643	Lining, friction	1

3-14. Tact. Trucks cont.

PROCEDURE:

- A. Disconnect battery ground cable. (Refer to TM 9-2320-280-20)
- B. Assemble NSN 4730-00-142-1958 quick disconnect (3), NSN 4730-00-223-9255 pipe coupling (2), and NSN 4730-01-242-7738 connector (1). (see Figure 3-17)
- C. Loosen clamp (2) and remove hose (1) from fitting (3). (see Figure 3-16)
- D. Install connector (1) to hose (5) and secure with clamp (4). (see figure 3-17)

NOTE

Apply 90 to 120 psi (620 to 827 kPa) air pressure to quick-disconnect, rotate fan and gain access to the six screws and three retaining plates on fan drive.

- E. Remove six screws (1) and three retaining plates (2) from fan drive (3). (see figure 3-18)
- F. Remove friction lining (4) from fan drive (3). (see figure 3-18)

NOTE

Friction lining may be a one or two piece construction, however installation instructions are not affected.

- G. Install new NSN 2930-01-189-8643 friction lining (4) in fan drive (3). (see figure 3-18)
- H. Install existing three retaining plates (2) to fan drive (3) and secure with six existing screws(1).(see figure 3-18) Tighten screws (1).
- I. Loosen clamp (4) and remove connector (1,) from hose (5). (see Figure 3-17)
- J. Connect hose (1) to fitting (3) and secure with existing clamp (2). (see figure 3-16)
- K. Connect battery ground cable. (Refer to TM 9-2320-280-20)
- I. Bleed power steering system. (Refer to TM 9-2320-280-20)

3-14. Tact. Trucks cont.

PUBLICATIONS AFFECTED:

TM9-2320-280-20

TM9-2815-237-34

LEVEL OF MAINTENANCE:

Unit and Direct Support

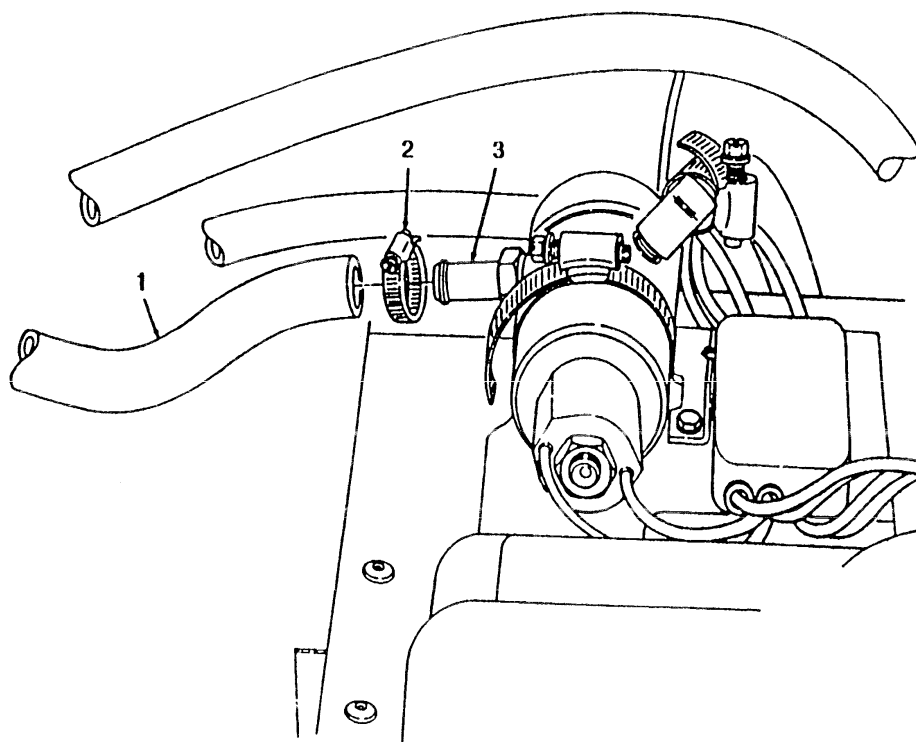


FIGURE 3-16

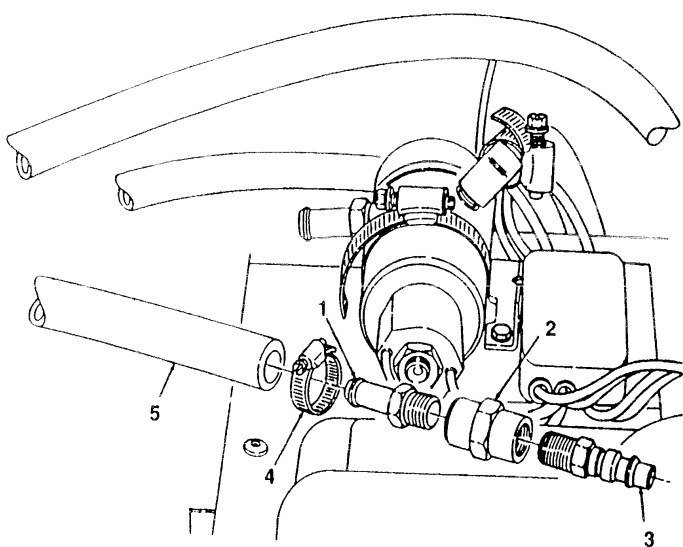


FIGURE 3-17

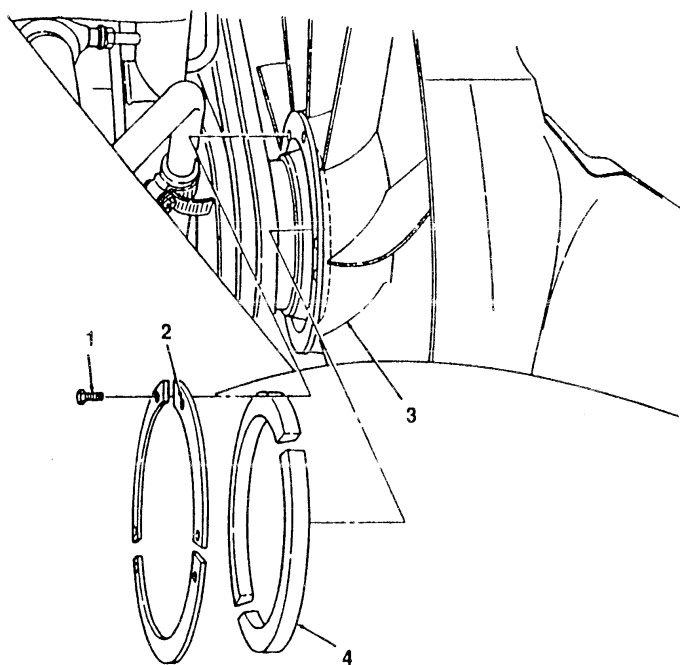


FIGURE 3-18

Cap Off Radiator

ANY OLD CAP WON'T DO WHEN YOU NEED A NEW ONE FOR YOUR VEHICLE'S RADIATOR. THE WRONG CAP CAN LEAVE YOU STRANDED ALONG THE SIDE OF THE ROAD.

Caps are rated for pressure. A radiator needs the right amount of pressure to do its cooling thing.

Pick a cap with too low a rating and coolant can boil off. A higher-rated cap will cause blown hoses or radiator seals, letting the coolant blow, too.

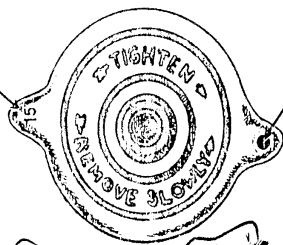
Use the cap in your vehicle's TM if you can. If not, check the PSI rating on the top of the cap. Find a cap with a rating as close as possible to the old one. Cap pressure is also usually listed in the -10 manual's equipment data section under cooling systems.

If lost caps are a problem, use chain to keep them around. NSN 4010-00-786-5485 brings chain by the foot. NSN 5315-00-514-2660 brings retaining pins to attach the chain.

If the cap doesn't have a hole for the chain, you can make one with the drill, NSN 5133-00-293-1849, in the Common shop sets. A 1/16-in hole should do the trick.

Check pressure rating

Drill hole for chain here



HMMWV . . .

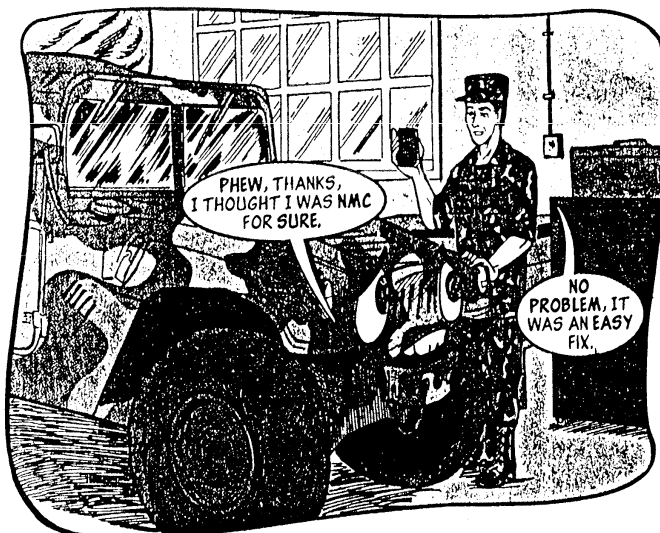
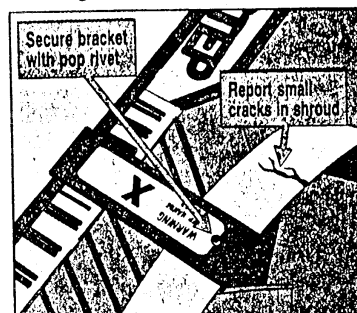
CRACKDOWN ON FAN SHROUD CRACKS

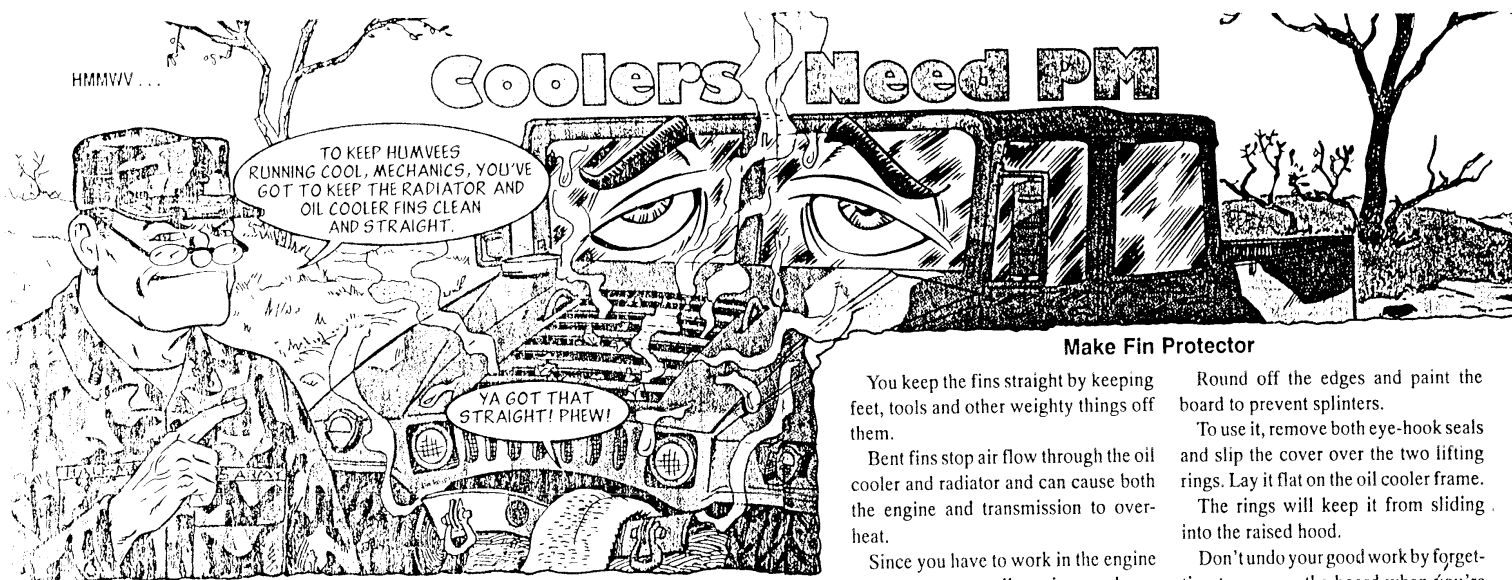
Now, courtesy of Change 4 to TM 9-2320-280-10, when the HMMWV's fan shroud is cracked, broken or loose, the vehicle is deadlined. It's a NOT MISSION CAPABLE fault in the operator's PMCS chart.

That's bad news since the fan shroud bracket has a tendency to loosen and fly off. Then the fan hits the shroud and damages it.

So, keep a close eye on the bracket. If it's loose, get your mechanic to rivet it to the shroud. All it takes is the blind rivet gun from the HMMWV special tool kit and pop rivet, NSN 5320-01-151-1061.

Your mechanic can fix small cracks in the shroud with fiberglass repair kit, NSN 2090-00-372-6064. Instructions come with the kit.





Keep Coolers Clean

You can keep them clean by getting rid of leaves, dirt and trash between the coolers.

There's not much room for you to get at the gunk, so try this cooling solution:

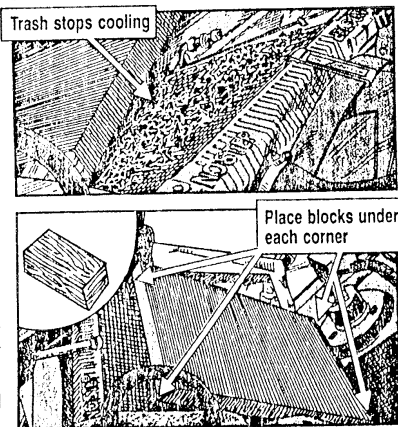
Remove the four sockethead screws and washers that hold the oil cooler to the radiator. Move the power steering cooler out of the way.

Raise the oil cooler carefully and place a 2x4x2 1/2-in block under each corner.

Clean between the coolers using only low-pressure water and low-pressure air.

Remove the wood blocks and secure the cooler in place.

Take care when handling the cooler so that you don't bend cooling fins. Wear gloves to protect your hands, too.



16

OCT 94

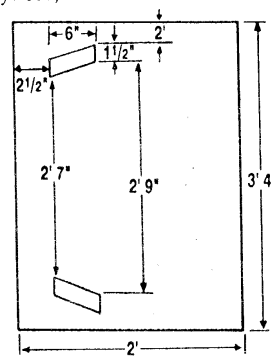
PS 503

Make Fin Protector

You keep the fins straight by keeping feet, tools and other weighty things off them.

Bent fins stop air flow through the oil cooler and radiator and can cause both the engine and transmission to overheat.

Since you have to work in the engine compartment to pull services or do repairs, make a fin protector to put over the cooler. You need a piece of 3/4-in plywood, cut like so:



These measurements are approximate. Measure your Humvee and make adjustments if necessary.

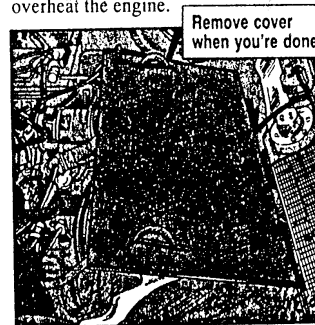
PS 503

Round off the edges and paint the board to prevent splinters.

To use it, remove both eye-hook seals and slip the cover over the two lifting rings. Lay it flat on the oil cooler frame.

The rings will keep it from sliding into the raised hood.

Don't undo your good work by forgetting to remove the board when you're done or running the engine when it's in place. The board will stop airflow and overheat the engine.



After use, replace the eye-hook seals and check for bent cooler fins. A fin-straightening tool, NSN 5120-00-157-2180, is being added to both common shop sets.

17

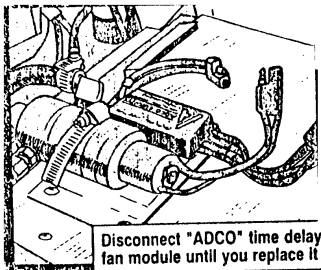
OCT 94

Fan Module Disconnect

Bum fan time delay switches on HMMWV's don't let the radiator fan kick in at 190 degrees F like there supposed to. The engine can't keep cool without circulating air. To find out if your truck's got a bum switch, take a walk tough the Motorpool.

Eyeball the HMMWV's module switch and the vehicle's serial number. On vehicles serial numbered 100000 through 112867 and 68555 through 72541 look for ADCO stamped on top of the switch. Replace the ADCO switch with a better one, NSN: 5945-01-193-7175.

Until you install the new switch, disconnect the ADCO module from the control valve connector. That way, the fan will continue to run, no matter what the temperature is.



HMMWV Fan Shroud Repair

Repair minor fan shroud damage on your HMMWV with fiberglass repair kit, NSN 2090 00-372-6064. Cracks and breaks that you can fix without removing the shroud are minor. Major damage means replacing the shroud.

Prevent damage by going slow when entering the water during fording operations. Make sure there's at least 1/4 inch clearance between the fan and shroud. If the fan is cracked or broken, replace it ASAP.

PS 520

9

MAR 96

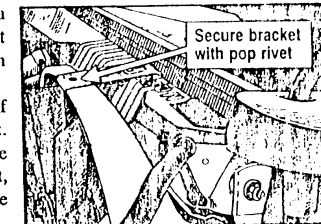
Rivet Holds Shroud Bracket

The Humvee fan shroud bracket has a habit of loosening and flying off. That lets the fan hit the shroud, shattering fan blades and damaging the shroud.

Check your vehicle's bracket, and if it's loose, get your mechanic to secure it.

All it takes is the blind riveter from the Humvee special tool kit and pop rivet, NSN 5320-01-151-1061. That'll hold the bracket in place.

PS 494



7

JAN 94

FAN DRIVE & BLADE OFF AS ONE



You can now remove the HMMWV's fan drive and fan blade as an assembly without removing the fan shroud and radiator.

Save that time and effort by using the word on Pages 3-13 through 3-15 in TB 43-0001-39-8 (Mar 96).

To make it easier to get to the four socket-head screws mounting the drive to the water pump pulley, you'll need to disengage the fan drive clutch. That takes compressed air applied to the clutch adapter.

Add a quick-disconnect to make fan disengagement a snap. With your commander's approval, add one using the info in Para 3-10, Pages 3-25 through 3-28, in TB 43-0001-39-3 (Dec 94).

Chapter 06

ELECTRICAL SYSTEM

Functional
Group Code
0601-0613

3-7. Tactical Trucks**MODEL:**

M998 Series HMMWV

SUBJECT:

60 Ampere Alternator Regulator Replacement

POC:

Ms. Patricia Grashik, AMSTA-IM-MTA, DSN 786-7713, Commercial (810) 574-7713
 grashikp@cc.tacom.army.mfl

COMMENTS:

60 ampere alternator charging problems could be caused by a faulty regulator. We are changing the current alternator trouble shooting procedures (TM9-2320-280-20-1, page 2-190). Unit maintenance will replace the regulator instead of the alternator, if voltage can't be adjusted.

MATERIALS/PARTS:

<u>PART NUMBER</u>	<u>NSN</u>	<u>NOMENCLATURE</u>
(19728)20X-4383*	*	Screw Self-tapping Regulator, Cover
19728) AMA2004S	2920-01-180-8666	End Head, Intermediate (includes ring seal)

*NSN presently being assigned. May be requisitioned by Part Number and CAGE.

PROCEDURES:**REMOVAL:****NOTE**

Regulator Is part of end cover. Do not disassemble.

1. Battery ground cable disconnected (TM9-2320-280-20-1, paragraph 4-57).
2. Hood raised and secured (TM9-2320-280-10).
3. Remove six screws (1), end cover (2), and "O" ring (3) from alternator end housing (4).
Discard "O" ring. (see figure 3-3)
4. Disconnect four leads (5) from terminals (6) on regulator (7).

3-7. Tact. Trucks cont.

INSTALLATION:

1. Connect four leads (5) to terminals (6) on regulator (7). (see figure 3-3)
2. Install "O" ring (3) and end cover (2) on alternator end housing (4) with six screws (1).
3. Connect battery ground cable (TM9-2320-280-20-1, paragraph 4-27).
4. Check alternator for correct output voltage adjustment (TM9-2320-280-20-2, para 4-2.c.).

PUBLICATIONS AFFECTED:

TM9-2320-280-20-1

TM9-2320-280-20-2

TM9-2320-280-20P

TM9-2320-280-34P

LEVEL OF MAINTENANCE:

Unit

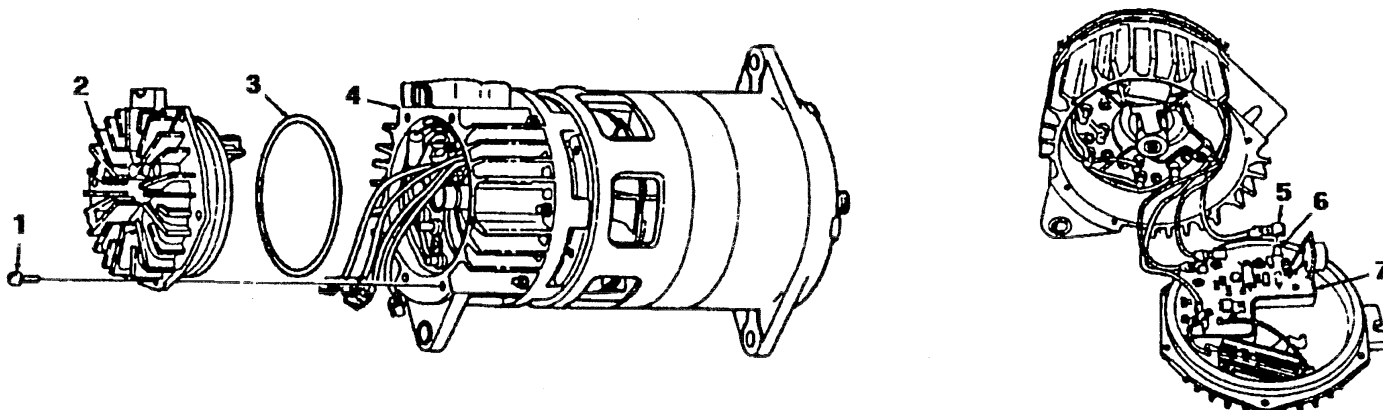


FIGURE 3-3

3-9. Tactical Trucks

MODEL:

M966, M966AI, M998, M998AI, M1025, M1025AI, M1026, M1026AI, M1035, M1035AI, M1037, M1038, M1038AI, M1042, M1043, M1043AI, M1044, M1044AI, M1045, M1045AI, M1046, and M1046AI

SUBJECT:

60/100 amp Alternator Bracket Modification

POC:

Mr. Ronald Hanebutt, AMSTA-IM-MTA, DSN 786-7151,
Commercial (810) 574-7151 hanebutr@cc.tacom.army.mil

DEFICIENCY:

The 60/100 amp alternator bracket NSN 5340-01-257-7706 fails when mounting bolts are over tightened to take out the gap present between the alternator and bracket.

COMMENTS:

Procedures have been developed for modifying the 60/100 amp alternator bracket. These corrective actions can be accomplished in the field by using the following parts and materials:

MATERIALS/PARTS:

<u>NSN/PN</u>	<u>CAGE C</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
B1821BHO44F975N	(05047)	Screw	1
5310-00-194-0743		Washer	1
5310-00-010-3329		Washer	1
5310-00-880-7745		Nut	1
5305-00-071-1788		Screw	1
5305-01-032-2311		Screw	1
5305-00-071-2064		Screw	1
5310-01-107-3570		Nut	4
9515-00-969-5124		Plate, Metal	A/R
9530-01-262-8866		Bar, Metal	A/R
5310-01-206-7306		Washer	1
5310-00-774-7293		Washer	3
5306-01-263-8889		Screw	1
5310-00-809-4085		Washer	2

3-9. Tact. Trucks cont.

Parts to be fabricated from materials requisitioned:

<u>NOMENCLATURE</u>	<u>QTY</u>
Drilling Fixture	1
Spacer	1

PROCEDURE:

A. FABRICATING DRILL FIXTURE AND SPACER.

1. Using NSN 9515-00-969-5124 metal plate, fabricate drill fixture. (see figure 3-18)
2. Locate, mark, and drill three 0.438-inch diameter holes in metal plate.
3. Install NSN 5305-00-071-1788 screw (2) and NSN 5305-00-071-2064 screw (4) on drill fixture (1) with three NSN 5310-01-107-3570 nuts (3). (see figure 3-19)
4. Using NSN 9530-01-262-8866 metal bar, fabricate spacer. (see figure 3-20)
5. Locate, mark, and drill 0.469-inch diameter hole in spacer.

B. ALTERNATOR BRACKET REMOVAL AND DRILLING.

1. Disconnect battery ground cables. (Refer to TM9-2320-280-20.)
2. Remove alternator bracket (1). (Refer to TM9-2320-280-20.)
3. Remove helical (2) from alternator bracket (1). (see figure 3-21)
4. Position fabricated drill fixture (2) in machine table vise (3). (see figure 3-22)
5. Position alternator bracket (1) and fabricated spacer (4) (see figure 3-23) on drill fixture (2) and secure with screw (4). (see figure 3-22)

NOTE

The following step requires a TIG welding process performed at DS level due to the aluminum content of the spacer and bracket.

6. Weld spacer (4) to alternator bracket (2). (see figure 3-23)

NOTE

When drilling alternator bracket, drill to maximum depth.

7. Drill 0.469-inch diameter hole in alternator bracket (1). (see figure 3-22)
8. Remove alternator bracket (1) from drill fixture (2).
9. Remove helical (3) from alternator bracket (1). (see figure 3-21)
10. Position alternator bracket (2) on drill fixture (3) and secure with NSN 5305-01-032-2311 screw (1), and NSN 5310-01-107-3570 nut (5). (see figure 3-23)

- 3-9. Tact. Trucks cont.**
11. Drill 0.469-inch diameter hole in alternator bracket (2).
 12. Remove screw (1), nut (5), and alternator bracket (2) from drill fixture (3).

C. BRACKET AND ALTERNATOR INSTALLATION.

1. Install alternator bracket(l) on frontof engine (2) with NSN 5306-01-263-8889 screw (11) and existing screw (6). (see figure 3-24) Tighten screws to 48 lb-ft (65 Nom).
2. Position power steering pump bracket (7) to alternator bracket (1) and install existing screw (9) and NSN 5310-01-206-7306 washer (10). Tighten screw to 48 lb-ft (65 Nom).

NOTE

Screws not tightened during steps 3 and 6 will be tightened during final preparation.

3. Install two existing screws (3), washers (5), NSN 5310-00-774-7293 washer (8), and NSN 5310-00-010-3329 washer (4) to power steering bracket (7) and alternator bracket (1). (see figure 3-24) Do not tighten screws.
4. Install power steering belts. (Refer to TM9-2320-280-20.)
5. Adjust power steering belts. (Refer to TM9-2320-280-20.)
6. Position alternator (7) between alternator bracket (10), rear support bracket (8), and bracket(6). Install B1821BHO44F975N screw (9), two NSN 5310-00-809-4085 washers (5), NSN 5310-00-194-0743 washer (11), and NSN 5310-00-880-7745 nut (12). (see figure 3-25) Do not tighten screw.
7. Install alternator adjustment bracket (1) on alternator bracket (10) and alternator (7), and secure with existing two screws (4), washers (2), and NSN 5310-00-774-7293 washers (3). Do not tighten screws.

D. FINAL PREPARATION.

1. Install electrical leads on alternator. (Refer to TM9-2320-280-20.)
2. Tighten rear support bracket stud and nut, if necessary. (Refer to TM9-2320-280-20.)
3. Install and adjust alternator belts. (Refer to TM9-2320-280-20.)
4. Connect battery ground cables. (Refer to TM9-2320-280-20.)

PUBLICATIONS AFFECTED:

TM9-2320-280-20

TM9-2320-280-20P

4-3. Tactical Trucks

MODEL:

M998 Series (HMMWV)

SUBJECT:

Alternator Installation

POC:

Mr. Keith Barthlow, AMSTA-IM-MTA, DSN 786-8288, Commercial (810)
574-8288 barthlok@cc.tacom.army.mil

DEFICIENCY:

Alternator brackets are being damaged when the spacer isn't installed between the alternator flange and the rear support bracket when replacing the alternator.

COMMENTS:

A. Units should pay particular attention to the alternator spacer during repair or replacement. Inspect to ensure the spacer is placed between the alternator flange and bracket.

B. Use the spacer listed in TM9-2320-280-20P, dated August 1994, Figure 34, Item 4, P/N (19207)
12338186-62, NSN 5310-01-337-7034 for 200 AMP and P/N (19207)
12338186-20, NSN 5310-01-127-2456, for 60 and 100 AMP. Spacers are available through the supply system.

PUBLICATIONS AFFECTED:

TM9-2320-280-20
TM9-2320-280-20P

LEVEL OF MAINTENANCE:

Unit

3-26. Tactical Trucks

MODEL:

M998 Series Vehicles, 1-1/4 ton 4x4

SUBJECT:

Niehoff 100 Amp Alternator Replacement Procedures

POC:

Mr. Eric Sutman, AMSTA-MTA, DSN 786-7151

DEFICIENCY:

Units lack technical maintenance manual support for the Niehoff 100 amp alternator system.

COMMENTS:

Procurement of replacement parts, installation, removal, and troubleshooting maintenance procedures have been developed for the Niehoff alternator system. These procedures can be accomplished in the field by using the following instructions, materials, and replacement parts list.

MATERIALS:

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
8030-00-111-2762	Sealing, Compound	1
6850-01-159-4844	Sealant Compound	1
8030-01-328-0574	Sealing Compound	1

PROCEDURES:**A. Replacement Parts.**

For 100 amp alternator system breakdown and part identification, refer to parts list and see figures 3-42 and 3-43.

<u>ITEM</u>	<u>CAGE</u>	<u>P/N OR NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
1	19207	12342944	Alternator Assembly	1
2		5301-01-348-8360	Nut, Lock	1
3		5310-01-348-8384	Washer, Flat	1

3-26. Tactical Trucks cont.

<u>ITEM</u>	<u>CAGE</u>	<u>P/N OR NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
4		3110-00-144-8561	Bushing	
5		5305-01-032-4165	Screw	4
6		5310-01-136-4888	Washer, Lock	4
7	76761	N9493	Cover Plate	1
8		5310-01-232-6617	Nut	6
9	76761	N9062	Washer, Flat	8
10		5310-01-362-6171	Nut	2
11	76761	N7398	Front Housing Assembly	1
12		5310-01-304-8733	Washer, Flat	4
13		5310-01-348-8398	Nut, Keps	2
14		5306-00-226-4824	Bolt	2
15		5310-00-407-9566	Washer, Lock	2
16		5310-01-348-8385	Washer, Flat	2
17		5365-01-136-7662	Retaining Ring	1
18	76761	N9486	Bearing, Ball (Front)	1
19		5365-01-136-4880	Retaining Ring (Inside)	1
20		5305-01-032-6099	Screw	6
21		5310-01-032-4827	Washer, Lock	8
22		5310-01-032-4169	Washer, Flat	8
23	76761	N7402	Rotor Assembly	2
24		5315-01-348-6880	Woodruff Key	1
25	76761	N7400	Core / Shaft Assembly	1
26	76761	N9494	Retaining Ring (Outside)	1
27		5310-01-165-1312	Nut,Lock	18
28	76761	N7399	Shell/Stator/Field Coil Assembly	1
29		3110-01-348-4867	Bearing, Ball (Rear)	1
30	76761	N3106	Regulator Assembly	1
31		5305-00-442-7347	Screw	2
32		5310-01-350-8549	Washer, Flat	1
33		5310-01-042-8391	Washer, Flat	1
34		5310-01-350-4257	Nut, Elastic Stop	1
35		5975-01-350-1987	Boot, Rubber	3
36		N9491	Fan, Molded	1

3-26. Tactical Trucks cont

<u>ITEM</u>	<u>CAGE</u>	<u>P/N OR NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
37		5310-01-050-6565	Washer, Flat	1
38	76761	N9092	Nut, Lock	1
39		N9495	Screw	3
40	19207	12342930	Fan Guard	1
41		N7401	End Housing Assembly	1
42	19207	12342711	Slidable Bushing	1
43		5310-00-209-0965	Washer, Lock	2
44		5310-00-637-9541	Washer, Lock	1
45		5306-01-114-0963	Bolt, Self-Locking	1

B. Alternator Troubleshooting Procedures.

- (1) For alternator system operation, refer to TM9-2320-280-20.
- (2) For alternator power-on system checks, refer to TM9-2320-280-20.
- (3) For alternator diagnostic flowchart, refer to TM9-2320-280-20.

C. 100 Ampere Regulator Replacement.

Removal Procedure.

NOTE

Prior to removal, tag leads for installation.

- (1) Disconnect ground cable from negative battery post.
- (2) Disconnect regulator plug (1) from voltage regulator (5). (see figure 3-44)
- (3) Slide back rubber boot (10) and remove keps nut (14), lead 568 (13), and washer (15) from red (energize) terminal (16). Discard keps nut (14).
- (4) Slide back rubber boot (10) and remove elastic stop nut (12), lead 2A (9), and washer (11) from yellow (AC) terminal (17). Discard elastic stop nut (12).
- (5) Remove two screws (6), lockwashers (7), and washers (8) securing voltage regulator (5) to alternator (18). Discard lockwashers (7).
- (6) Remove capscrew (4), lockwasher (3), and washer (2) securing voltage regulator (5) to alternator (18). Discard lockwasher (3).

3-26. Tactical Trucks
cont.

Installation Procedure.

- (1) Apply NSN 8030-00-111-2762 sealing compound to threads of capscrew (4). (see figure 3-44)
- (2) Install voltage regulator (5) on alternator (18) and secure with washer (2), lockwasher (3), and capscrew (4). Tighten capscrew (4) to 90 lb-in (10 N•m).
- (3) Apply NSN 8030-00-111-2762 sealing compound to threads of two screws (6).
- (4) Install two washers (8), lock washers (7), and screws (6) in voltage regulator (5) and alternator (18). Tighten screws (6) to 30 lb-in (3 N•m).
- (5) Install washer (15), lead 568 (13), and keps nut (14) on red (energize) terminal (16). Tighten keps nut (14) to 25 lb-in (3 N•m).
- (6) Apply 8030-01-328-0574 sealing compound to lead 568 (13) and keps nut (14) on red (energize) terminal (16). Slide rubber boot(10) on lead 568 (13) over red (energize) terminal (16).
- (7) Install washer (11), lead 2A (9) and elastic stop nut (12) on yellow (AC) terminal (17). Tighten elastic stop nut (12) to 20 lb-in (2 N•m).
- (8) Apply 8030-01-328-0574 sealing compound to lead 2A (9) and elastic stop nut (12) on yellow (AC) terminal (1 7). Slide rubber boot (10) on lead 2A (9) over yellow (AC) terminal (17).
- (9) Connect regulator plug (1) to voltage regulator (5).
- (10) Connect ground cable to negative battery post.

D. 100 Ampere Alternator Replacement. Removal Procedure.

NOTE

Prior to removal, tag leads for installation.

- (1) Disconnect ground cable from negative battery post.
- (2) Remove screw (6), lockwasher (7), washer (8), and lead 3B (9) from ground point (IO) on alternator (1). (see figure 3-45) Discard lockwasher (7).
- (3) Slide back rubber boot (5) and remove keps nut (4), washer (3), and lead 5A (2) from positive terminal (II) on alternator (1). Discard keps nut (4).
- (4) Slide back rubber boot (18) and remove keps nut (I 9), lead 568 (15), and washer (20) from red (energize) terminal (21). Discard keps nut (19).
- (5) Slide back rubber boot (16) and remove elastic stop nut (1 7), lead 2A (1 3), and washer (14) from yellow (AC) terminal (12). Discard elastic stop nut (17).

Tactical Trucks cont.

- (6) Loosen two capscrews (31) and (36) on alternator adjusting bracket (33.).
- (7) Loosen two capscrews (38) and (39) securing alternator (1) to mounting bracket (30), power steering line support bracket (41), and rear support bracket (42). (see figure 3-45)
- (8) Remove two drivebelts (34) from alternator pulley (24).

WARNING

Alternator must be supported during removal and Installation. Failure to support alternator may cause Injury to personnel or damage to equipment.

- (9) Remove capscrew (31) and lockwasher (32) securing adjusting bracket (33) to alternator (1). (see figure 3-45) Discard lockwasher (32).
- (10) Remove capscrew (36), washer (35), and adjusting bracket (33) from mounting bracket (30). Discard capscrew (36).
- (11) Remove two capscrews (38) and (39) and lockwashers (37) and (40) securing alternator (1), power steering lines bracket (41), and rear support bracket (42) to mounting bracket (30). Discard lockwashers (37) and (40).
- (12) Remove alternator (1).
- (13) Remove three capscrews (27) and washers (28) securing fan guard (29) to alternator (1).
- (14) Remove nut (22) and washer (23) from shaft assembly (25) on alternator (1). Discard nut (22).
- (15) Remove pulley (24) and woodruff key (26) from shaft assembly (25) on alternator (1).

Installation Procedure.

- (1) Install woodruff key (26) and pulley (24) to shaft assembly (25) on alternator (1). (see figure 3-45)
- (2) Install washer (23) and nut (22) to shaft assembly (25) on alternator (1). Tighten nut (22) to 120 lb-ft (163 N●m).
- (3) Install fan guard (29) on alternator (1) and secure with three washers (28) and capscrews (27). Tighten capscrews (27) to 90-120 lb-in (10-12 N●m).

WARNING

Alternator must be supported during removal and Installation. Failure to support alternator may cause Injury to personnel or damage to equipment.

3-26. Tactical Trucks cont.

- (4) Position alternator (1) on mounting bracket (30) and secure with washer- (37) and capscrew (38). (see figure 3-45) Do not tighten capscrew (38).
- (5) Position power steering line support bracket (41), rear support bracket (42), and alternator (1) to mounting bracket (30) and secure with washer (40) and capscrew (39). Do not tighten capscrew (39).
- (6) Position alternator adjusting bracket (33), washer (35), and capscrew (36) to mounting bracket (30). Do not tighten capscrew (36).
- (7) align alternator (1) with adjusting bracket (33) and install lockwasher (32) and capscrew (31). Do not tighten capscrew (31).
- (8) Install two drive belts (34) on pulley (24).
- (9) Adjust alternator and power steering belts. (Refer to TM9-2320-280-20.)
- (10) Install washer (20), lead 568 (15), and keps nut (19) on red (energize) terminal (21). Tighten keps nut (19) to 25 lb-in (3 N●m).
- (11) Apply NSN 8030-01-328-0574 sealing compound to lead 568 (15) and keps nut (19) on red (energize) terminal (21). Slide rubber boot (18) on lead 568 (15) over terminal (21).
- (12) Install washer (14), lead 2A (13), and elastic stop nut (17) on yellow (AC) terminal (12). Tighten elastic stop nut (17) to 20 lb-in (2 N●m).
- (13) Apply NSN 8030-01-328-0574 sealing compound to lead 2A (13) and elastic stop nut (17) on yellow (AC) terminal (12). Slide rubber boot (16) on lead 2A (13) over yellow (AC) terminal (12).
- (14) Install lead 5A (2), washer (3), and keps nut (4) to positive terminal (11) on alternator (1). Tighten nut (4) to 65 lb-in (7 N●m).
- (15) Apply NSN 8030-01-328-0574 sealing compound to lead 5A (2) and keps nut (4) to positive terminal (11) on alternator (1). Slide rubber boot (5) on lead 5A (2) over positive terminal (11).
- (16) Install lead 3B (9), washer (8), lockwasher (7), and screw (6) to ground point (10) on alternator (1). Tighten screw (6) to 80 lb-in (9 N●m).
- (17) Apply NSN 8030-01-328-0574 sealing compound to lead 3B (9) and screw (6) on ground point (10) and alternator (1).
- (18) Connect ground cable to negative battery post.

E. 100 Amperes Alternator Testing and Repair**Alternator Output Testing Procedure**

3-26. Tactical Trucks cont.

- (1) Mount pivot arm of 500-amp test stand to high speed side and screw mounting flange adapter to pivot arm. Connect pulley drive shaft to high speed head. Screw pulley drive shaft to mounting flange adapter.
- (2) Mount alternator to starter / alternator mounting bracket on 500-amp test stand. Connect "V" belt from 500-amp test stand pulley to alternator pulley. Adjust belt tension.

NOTE

Figures 3-56 and 3-57 illustrate connecting and testing 1 00-amp alternator system with applicable test stands. Prior to operation of test stand ensure all switches and controls are in the "initial" position. Refer to:

- a) TM9-4910-663-12 for UMC model GASR-500.
- b) TM9-4910-485-12 for sun model AGT-9/9A.

- (3) Connect cable from alternator ground terminal to 500-amp test stand "G-" terminal. Connect cable from alternator "BAT" terminal to 500-amp test stand "G+" terminal. Connect cable from alternator regulator- "IGN" to 500-amp test stand "F" terminal.
- (4) Make a jumper wire with a ring terminal at both ends. Connect jumper wire on 500-amp test stand from "IGN" switch terminal to "F-B" terminal.
- (5) Set 500 amp test stand as follows:

	<u>GSAR-500</u>	<u>SUN</u>
a. DC Load Ammeter Switch to	X10	500 amp
b. DC Field Ammeter- to	X1	5 amp
c. Field Circuit Switch to	Regulator	Regulator
d. DC Voltmeter select to	Rect / Gen	Rect / Gen
- (6) Perform no-load test. Set test stand battery circuit selector to 24 VDC, IGN switch to ON, and start varidrive. Observing the DC voltmeter output voltage and tachometer rpm, increase speed until tachometer reads 5000 rpm. Record voltmeter reading and refer to table 6-A for diagnosis.
- (7) Perform full-load test. Set test stand battery circuit selector to 24 VDC, IGN switch to ON, start varidrive, and set the 100A load bank switch to ON. Snap the load bank master switch to the ON position and adjusting variable load control to 91 ± 10 percent amp load. Observing the DC output readings. Refer to table 6-B for diagnosis.
- (8) Regulator Bypass Test.

3-26. Tactical Trucks cont.**NOTE**

Perform this test only when instructed from tables 6-A and 6-B

- a. Prepare alternator as in full-load test.

NOTE

Use jumper wire rated for 15 amps.

- b. Disconnect alternator connector from regulator. With alternator spinning, use jumper wire and short pin "A" of connector to ground momentarily. Record results.
- c. Ampere should rise within ± 10 percent of rated output with jumper wire connected and fall with jumper wire disconnected. Refer to table 6-C for diagnosis.
- (9) Turn test stand master power switch and load switch to "OFF".
- (10) Disconnect jumper wires from terminals on test stand and alternator.
- (11) Remove "V" belt from test stand pulley and alternator pulley. Remove alternator from test stand.

AMPS	VOLTS	DIAGNOSIS
High	Low	Test bench battery is discharged (or defective). Allow to charge (or replace).
High	Normal	Give time to stabilize while monitoring volts. If volts rise above normal range (26-30 volts), regulator and / or tube assembly must be replaced. If amps fall, charging system is OK.
High	High	Stop test. Regulator and / or tube assembly must be replaced. Refer to static testing.
Low	Low	Alternator and / or regulator must be repaired or replaced. Perform regulator bypass test. Refer to table 6-C.
Low	Normal	Regulator OK Perform full-load test. Refer to table 6B.
Low	High	Stop test. Bench malfunction or wiring error

Table 6-A. No-Load Test

3-26. Tactical Trucks cont.

<u>AMPS</u>	<u>VOLTS</u>	<u>DIAGNOSIS</u>
High	Low	Test bench battery is discharged (or defective). Allow to charge(or replace).
High	Normal	Charging system OK.
High	High	Stop test. Regulator and / or tube assembly must be replaced. Refer to static testing.
Low	Low	Alternator and / or regulator must be repaired or replaced. Perform regulator bypass test. Refer to table 6-C.
Low	Normal	Increase load.
Low	High	Stop test. Bench malfunction or wiring error.

Table 6-B. Full-Load Test.

CONNECT	DISCONNECT	DIAGNOSIS
Amps Rise	Amps Fall	Alternator OK. See note. Replace regulator only if low amps/low volts are indicated in table 6-A and/ or table 6-B.
No Charge	No Charge	Alternator must be repaired. Refer to static testing.

Table 6-C. Regulator Bypass Test.**Disassembly Procedure.****NOTE**

Complete alternator disassembly is not required for static testing.

3-26. Tactical Trucks cont.

- (1) Secure core and shaft assembly (1) in a soft-jawed vise and remove locknut (4), washer (3), and fan (2). (see figure 3-46) Discard locknut (4).
- (2) Remove bearing bushing (1) from core and shaft assembly (9). (see figure 3-47).
- (3) Remove four screws (2) and lockwashers (3) securing cover plate (4) to front housing assembly (5). Discard lockwashers (3).
- (4) Scribe alignment marks (8) on front housing assembly (5) to shell stator / field coil assembly (6) and end housing assembly (7).
- (5) Disconnect regulator plug (1) from voltage regulator (5). (see Figure 3-44).
- (6) Remove two screws (6), lockwashers (7), and washers (8) securing voltage regulator (5) to alternator (18). Discard lockwashers (7).
- (7) Remove capscrew (4), lockwasher (3), and washer (2) securing voltage regulator (5) to alternator (18). Discard lockwasher (3).
- (8) Remove nine locknuts (7) securing end housing assembly (6) to shell / stator / field coil assembly (1). (see figure 3-48). Discard locknuts (7).
- (9) Use a puller to remove end housing assembly (6) from shell / stator / field coil assembly (1).
- (10) Remove three screws (5), lockwashers (4), and washers (3) securing rotor assembly (2) to core and shaft assembly (9). Discard lockwashers (4).
- (11) Use three 10-32x2-inch machine screws (5) as jacks in threaded holes (1) on end plate of rotor assembly (4). Gradually tighten screws (5) and remove rotor assembly (4) from core and shaft assembly (2). (see figure 3-49).
- (12) Use a press or bearing puller to remove rear bearing (3) from core and shaft assembly (2).

NOTE

Prior to removal, tag leads for installation.

- (13) Remove eight nuts (1) securing two field leads (2) and six phase leads (5) to diodes in Front housing assembly (7) and disconnect leads (2) and (5). (see figure 3-50)
- (14) Remove nine locknuts (1) securing front housing assembly (6) to shell stator / field coil assembly (2). (see figure 3-51) Discard locknuts (1).
- (15) Remove front housing assembly (6) from shell / stator / field coil assembly (2) by tapping lightly with a soft-faced mallet.
- (16) Remove retaining ring (1) from core and shaft assembly (2) and front housing assembly (3). (see figure 3-52)

3-26. Tactical Trucks cont.

WARNING

Always support alternator core shaft assembly during removal. Failure to do so may cause injury to personnel or equipment damage.

- (17) Use press to remove core and shaft assembly (2) from front bearing (4) and front housing assembly (3). (see figure 3-52)
- (18) Remove front (1) and rear (4) retaining rings from front housing assembly (2). (see figure 3-53)
- (19) Use a press to remove front bearing (3) from front housing assembly (2).
- (20) Remove three screws (6), lockwasher-s (5), and washers (4) securing front rotor assembly (2) to core and shaft assembly (3). (see figure 3-54) Discard lockwashers (5).
- (21) Use three 10-32x2-inch machine screws (1) in threaded holes on end plate of front rotor assembly (2). Gradually tighten screws (1) and remove rotor assembly (2) from core and shaft assembly (3).

Static Testing Procedure.**NOTE**

Refer to disassembly procedure for component removal, if necessary.

- (1) Perform Stator Test.
 - a. Remove six nuts and phase leads from diodes in front housing. (see figure 3-55)
 - b. Set ohmmeter to X1 scale and zero ohmmeter.
 - c. Connect ohmmeter leads between each successive pair of stator phase leads "P1" - "P2", "P2" - "P3", and "P1" - "P3". Ohmmeter should read less than 1 ohm. If ohmmeter reads infinity (∞), the stator is open. Replace alternator.
 - d. Set ohmmeter to X10 scale and zero ohmmeter.
 - e. Connect ohmmeter leads between each phase lead, "P1", "P2", and "P3" and the ground point on outside of front housing. Ohmmeter should read infinity (∞). If ohmmeter reads zero, the stator is grounded. Replace alternator.
 - f. Repeat step (e) to check phase leads "P4", "P5", and "P6".

3-26. Tactical Trucks cont.

(2) Perform Field Coil Test.

- a. Remove two nuts and field coil leads (F+, F-) from diodes in front housing. (see figure 3-55)
- b. Set ohmmeter to X1 scale and zero ohmmeter.
- c. Connect ohmmeter leads to the two field coil leads (F+, F-). Ohmmeter should read less than 3 ohms. If ohmmeter reads more than 3 ohms, the field coil is open. Replace alternator.
- d. Set ohmmeter to X10 scale and zero ohmmeter.
- e. Connect one ohmmeter lead to a field coil lead and the other to the ground point on the front housing. Ohmmeter should read infinity (∞). If ohmmeter reads less than 100K ohms, the field coil is grounded. Replace alternator.

(3) Perform Positive Diode Test.

- a. Set ohmmeter to X100 scale and zero ohmmeter.
- b. Connect one ohmmeter lead to the "B+" output stud and the other lead to each of the six diode terminals "S". (see figure 3-55) Ohmmeter should read nearly alike for all six, either less than 600 ohms or infinity (∞). Reverse ohmmeter leads. Ohmmeter should read nearly alike for all six, but opposite the first set of readings. If readings are not opposite, the diode rectifier assembly is open. Replace alternator.

(4) Perform Negative Diode Test.

- a. Set ohmmeter to X100 scale and zero ohmmeter.
- b. Connect one ohmmeter lead to the ground point and the other lead to each of the six diode terminals "S". (see figure 3-55) Ohmmeter should read nearly alike for all six, either less than 600 ohms or infinity (∞). Reverse ohmmeter leads. Ohmmeter should read nearly alike for all six, but opposite the first set of readings. If readings are not opposite, the diode rectifier assembly is open. Replace alternator.

Cleaning Procedure.

Clean all alternator components in accordance with TM9-2320-280-34, paragraph 2-9.

Assembly Procedure.

3-26. Tactical Trucks cont.

WARNING

**Always support alternator core and shaft assembly during Installation.
Failure to do so may cause injury to personnel or equipment damage.**

- (1) Install front rotor assembly (2) on core and shaft assembly (3). (see figure 3-54)
- (2) Apply NSN 8030-00-111-2762 sealing compound to three screws (6).
- (3) Align slots in front rotor assembly (2) to mount holes on core and shaft assembly (3) and secure with three screws (6), lockwashers (5), and washers (4). Tighten screws (6) to 45 lb-in (5 N●m).
- (4) Coat outer race of front bearing (3) with a thin coat of NSN 8030-00-111-2762 sealing compound. (see figure 3-53)
- (5) Use a press to install front bearing (3) in front housing assembly (2).
- (6) Install front (1) and rear (4) retaining rings in front housing assembly (2).

WARNING

**Always support alternator core and shaft assembly during Installation.
Failure to do so may cause Injury to personnel or equipment damage.**

- (7) Use a press to install front bearing (4) and front housing assembly (3) on core and shaft assembly (2). (see figure 3-52)
- (8) Install retaining ring (1) on core and shaft assembly (2). (9) Insert core and shaft assembly (5) and front housing assembly (6) into shell stator/ field coil assembly (2). (see figure 3-51)

NOTE

Align scribe marks on front housing assembly and shell / stator / field coil assembly.

- (10) Feed leads (4) from shell / stator / field coil assembly (2) through front housing assembly (6). (see figure 3-51)
- (11) Apply NSN 8030-00-111-2762 sealing compound to studs (3) on shell stator / field coil assembly (2).
- (12) Secure front housing assembly (6) to shell / stator/ field coil assembly (2) with nine locknuts(1). Tighten locknuts (1) to 18 lb-in (2 N●m).

3-26. Tactical Trucks cont.

- (13) Install six washers (3), phase leads (5), and nuts (8) to diodes (6) on front housing assembly (7). (see figures 3-50 and 3-55) Tighten nuts (8) to 18 lb-in (2 N•m).
- (14) Install two washers (3), field leads (2), and nuts (1) to studs (4) on front housing assembly (7). Tighten nuts (1) to 18 lb-in (2 Nom).
- (15) Apply a thin coat of NSN 8030-01-159-4844 sealant to leads (2) and (5) on studs (4), diodes (6), and front housing assembly (7).

WARNING

Always support alternator core and shaft assembly during Installation. Failure to do so may cause Injury to personnel or equipment damage.

- (16) Use a press to install rear bearing (3) on core and shaft assembly (2). (see figure 3-49)
- (17) Install rear rotor assembly (4) on core and shaft assembly (2).
- (18) Apply NSN 8030-00-111-2762 seating compound to three screws (5). (see figure 3-48)
- (19) Align slots in rear rotor assembly (2) to mount holes on core and shaft assembly (9) and secure with three screws (5), lockwashers (4), and washers (3). Tighten screws (5) to 45 lb-in (5 N•m).

NOTE

Align scribe marks on end housing assembly and shell / stator / field coil assembly.

- (20) Install end housing assembly (6) on core and shaft assembly (9) and rear bearing (10). (see Figure 3-48) Tap lightly with a soft-faced mallet.
- (21) Apply NSN 8030-00-111-2762 sealing compound to studs (8) on shell stator/ field coil assembly (1).
- (22) Secure end housing assembly (6) to shell / stator / field coil assembly (1) with nine locknuts (7). Tighten locknuts (7) to 18 lb-in (2 N•m).
- (23) Apply NSN 8030-00-111-2762 sealing compound to threads of capscrew (4). (see figure 3-44)
- (24) Install voltage regulator (5) on alternator (18) and secure with washer (2), lockwasher (3), and capscrew (4).
- (25) Apply NSN 8030-00-111-2762 sealing compound to threads of two screws (6).
- (26) Install two washers (8), lockwashers (7), and screws (6) in voltage regulator (5) and alternator (18).
- (27) Connect regulator plug (1) to voltage regulator (5).

3-26. Tactical Trucks cont.

- (28) Install fan(2) on core and shaft assembly (1) and secure with washer (3) and locknut (4). (see figure 3-46)

WARNING

Always support alternator core and shaft assembly during Installation. Failure to do so may cause Injury to personnel or equipment damage.

- (29) Secure core and shaft assembly (1) on a soft-jawed vise. (see figure 3-46) Tighten locknut (4) to 50 lb-ft (68 N●m).
- (30) Install coverplate (4) on front housing assembly (5) and secure with four lockwashers (3) and screws (2). (see figure 3-47)
- (31) Install bearing bushing (1) on core and shaft assembly (9).

PUBLICATIONS AFFECTED:

TM9-2320-280-20
TM9-2320-280-20P
TM9-2320-280-34
TM9-2320-280-34P

LEVEL OF MAINTENANCE:

Unit and Direct Support

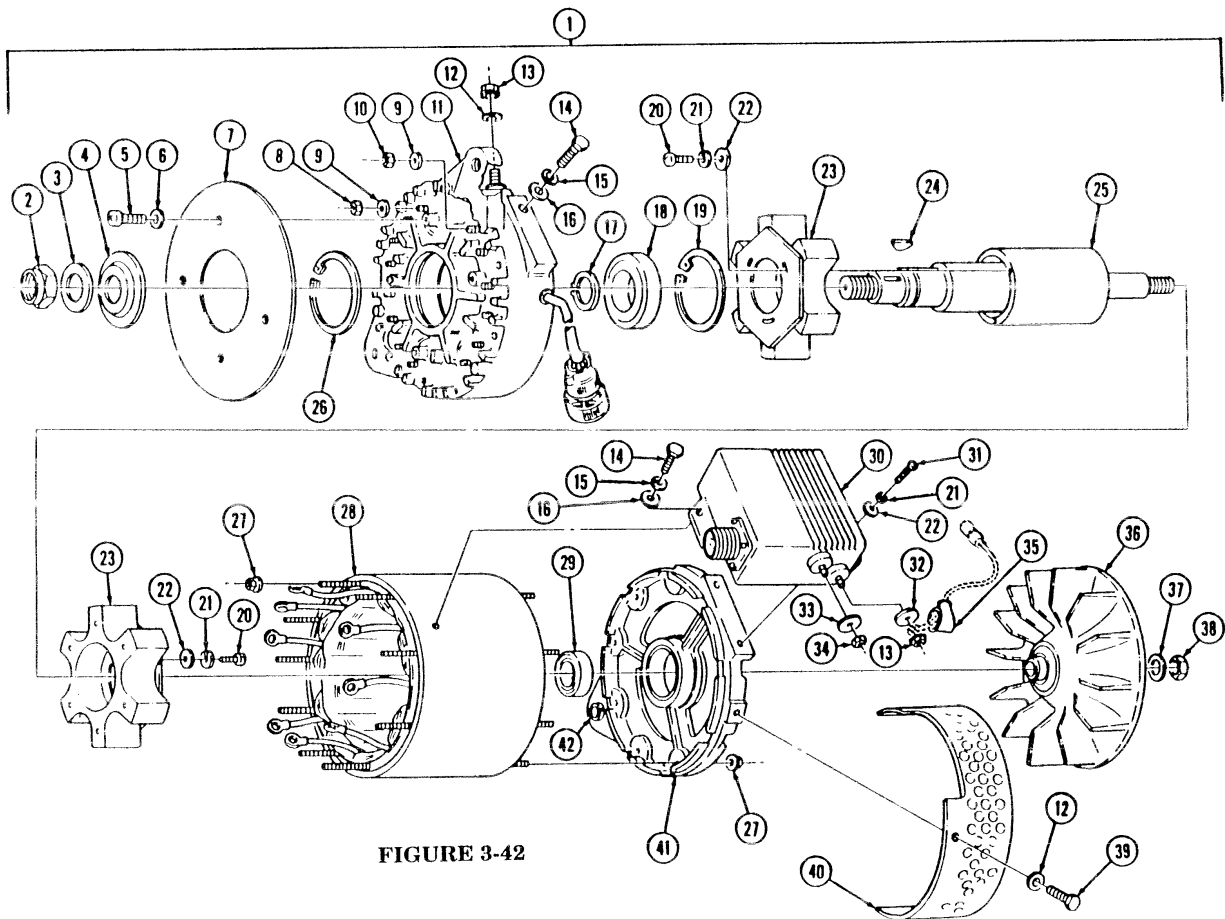


FIGURE 3-42

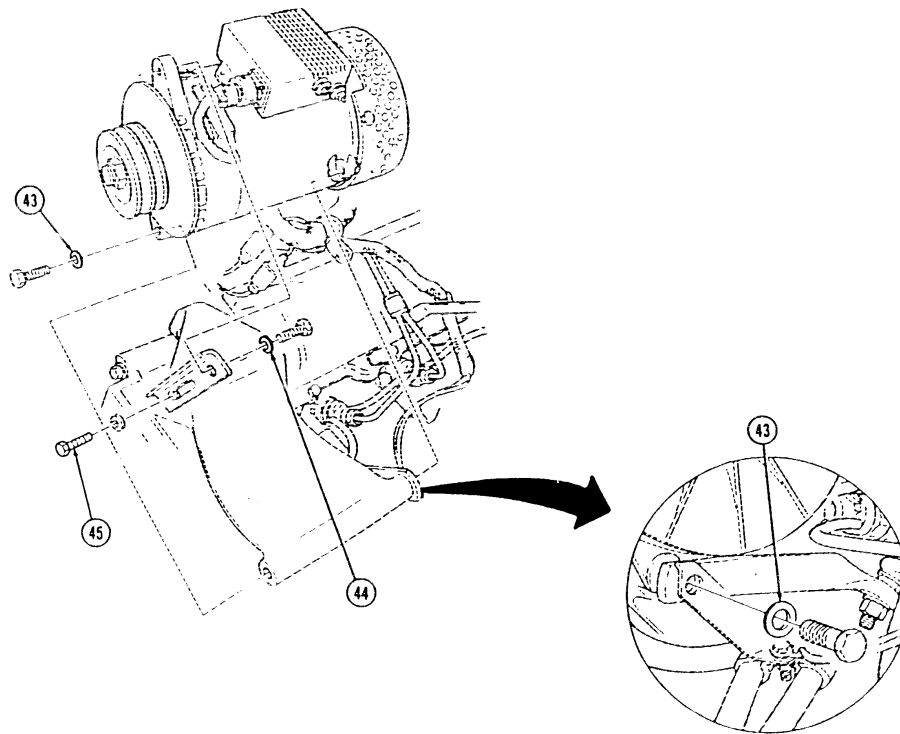


FIGURE 3-43

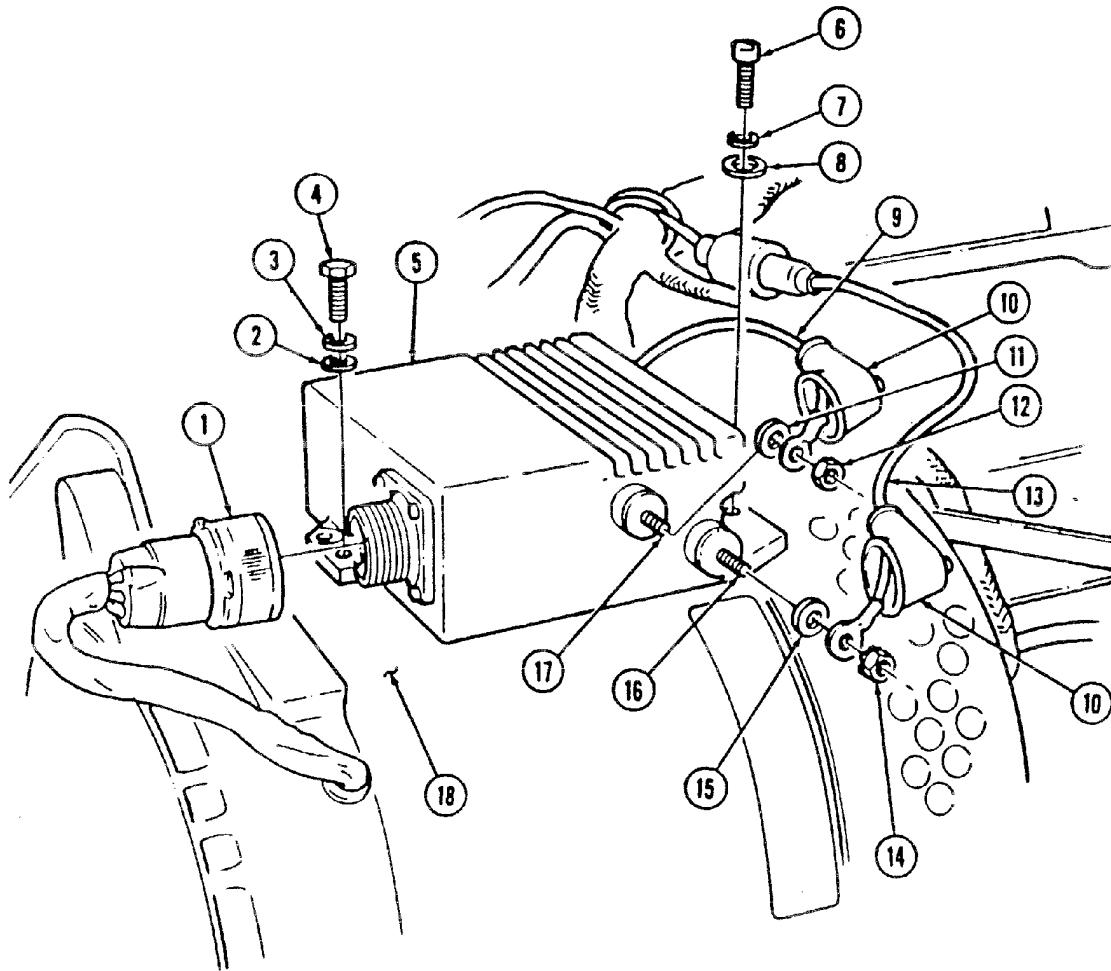


FIGURE 3-44

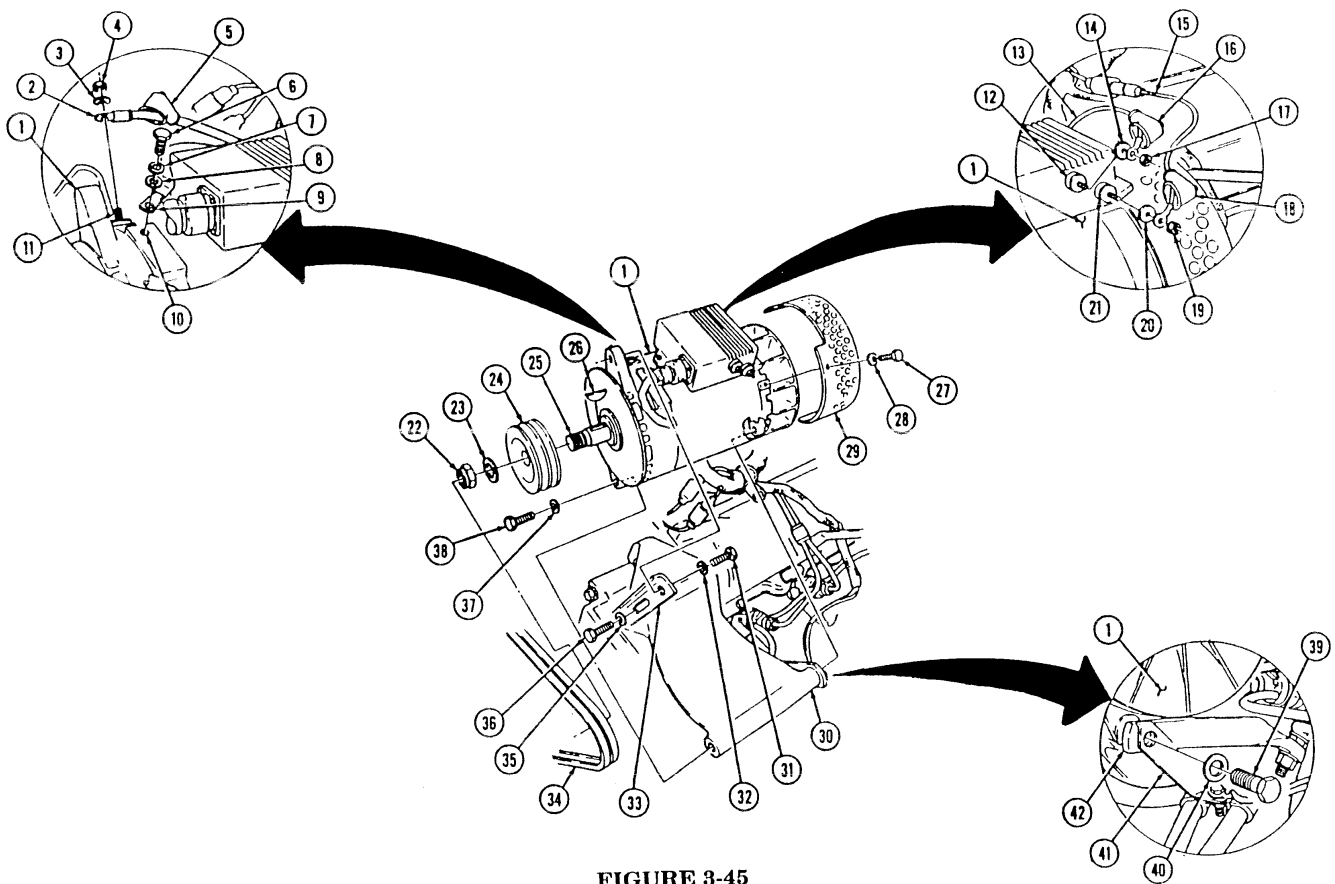


FIGURE 3-45

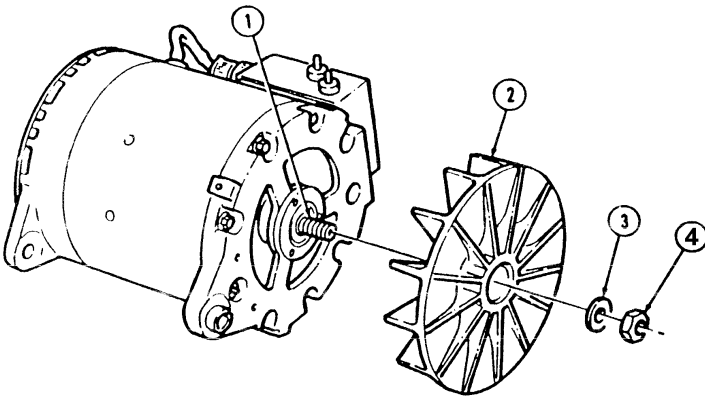


FIGURE 3-46

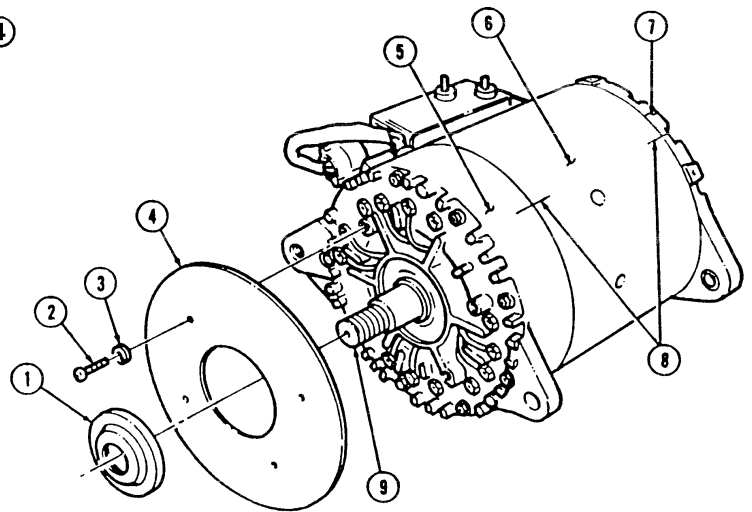


FIGURE 3-47

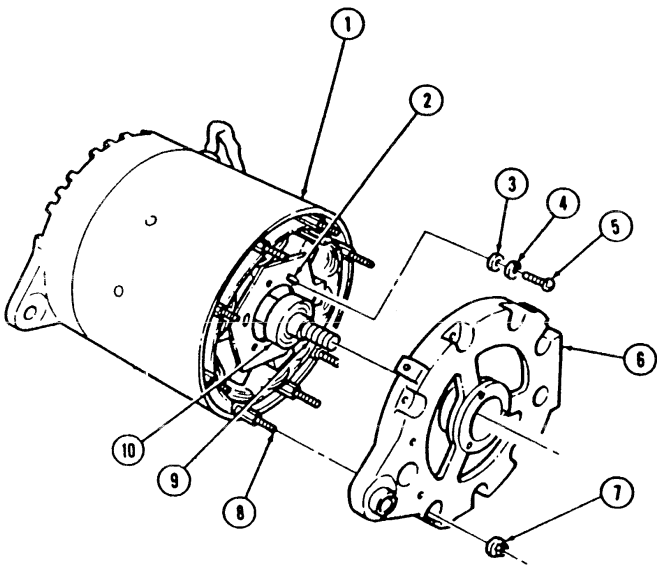


FIGURE 3-48

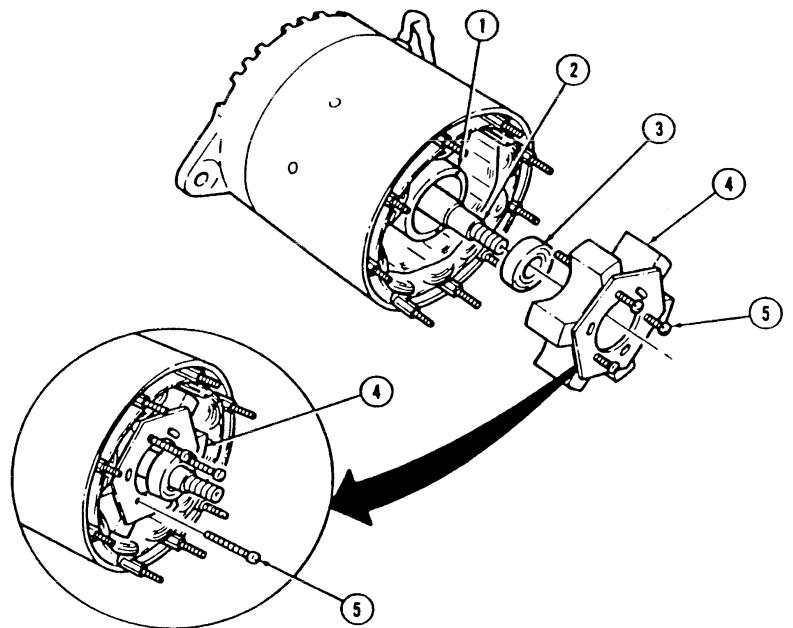


FIGURE 3-49

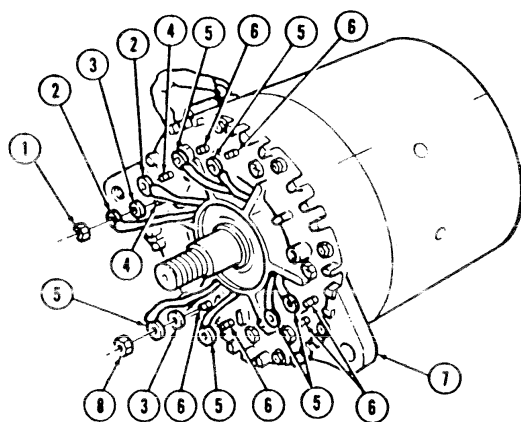


FIGURE 3-50

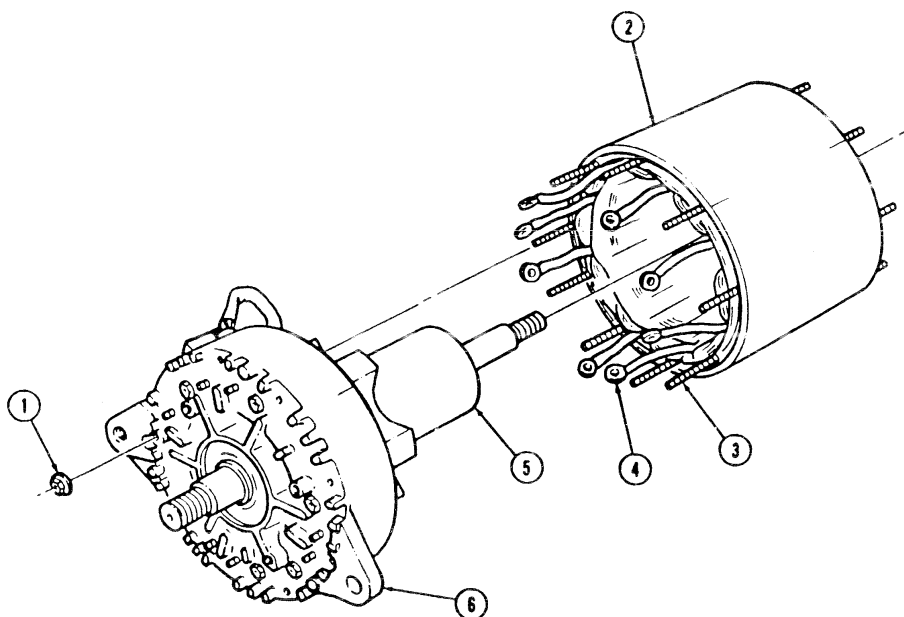


FIGURE 3-51

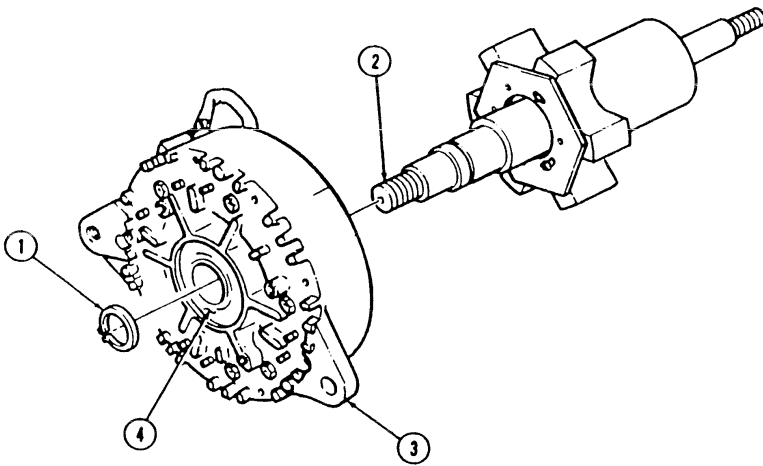


FIGURE 3-52

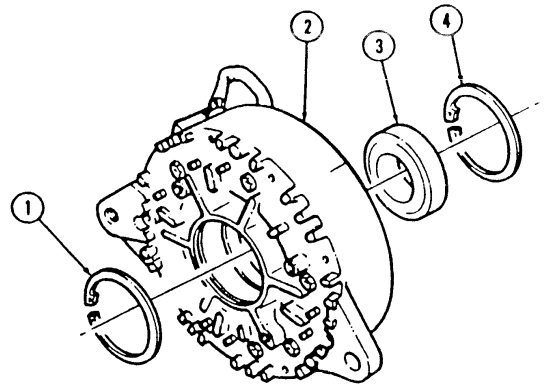


FIGURE 3-53

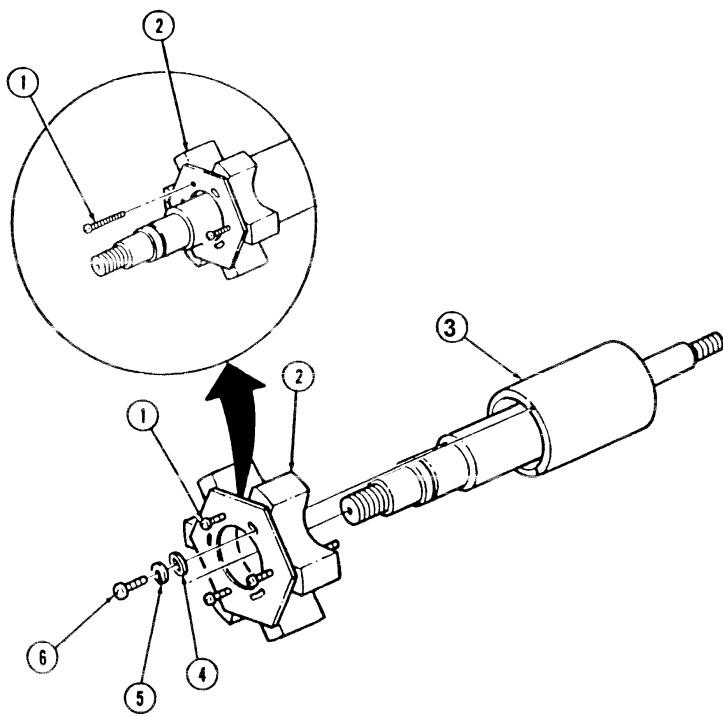


FIGURE 3-54

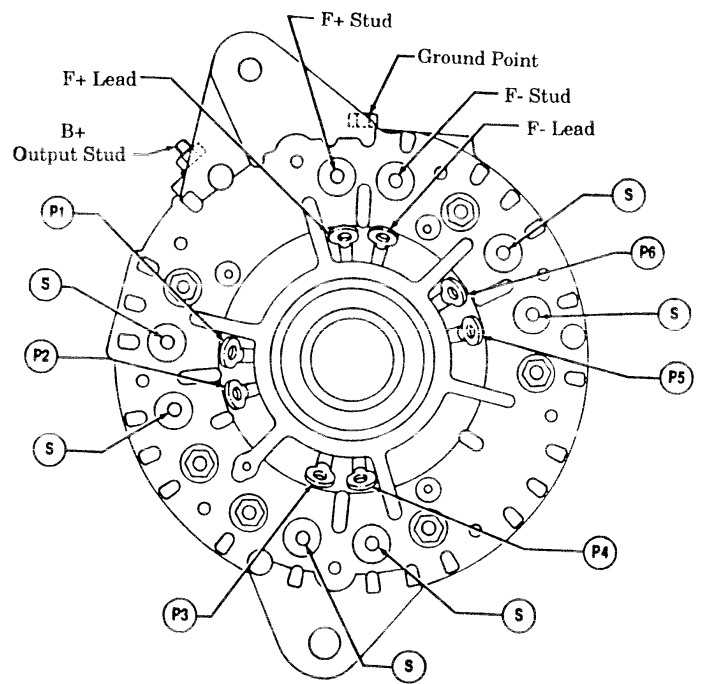
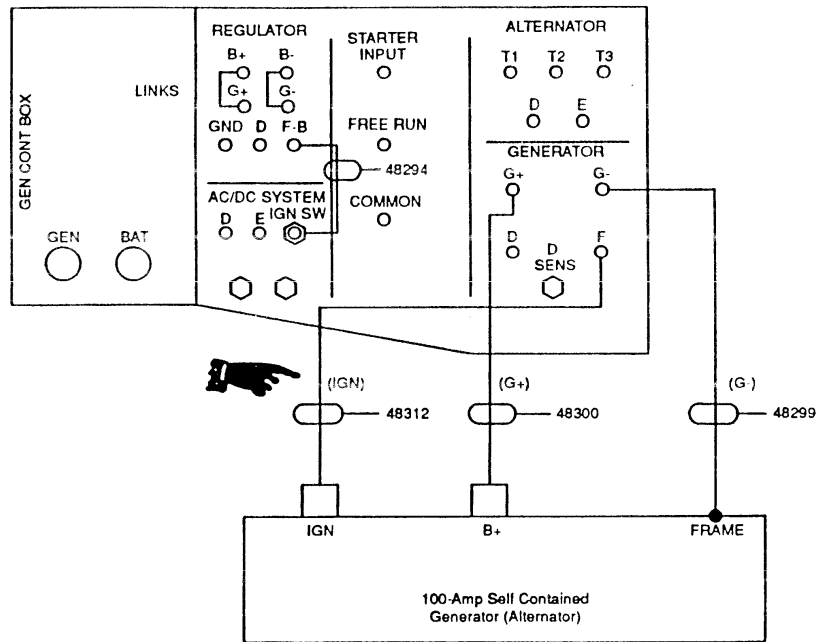
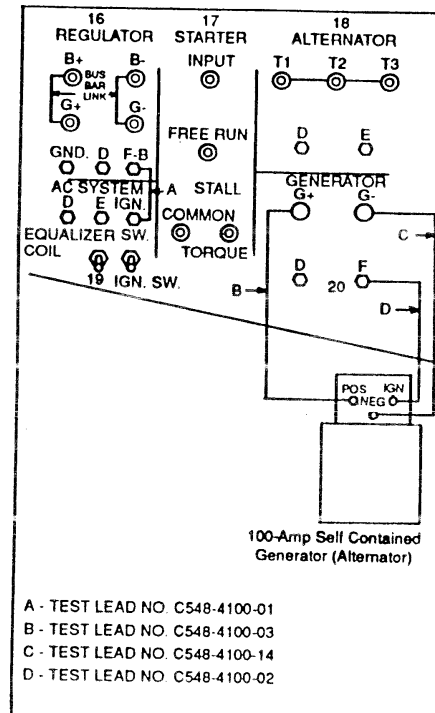


FIGURE 3-55



Note
Connecting and Testing 100-Ampere Generator
(Alternator) with Model Gasr-500, P/N 7458-2
and 7458-4 Test Stands.

FIGURE 3-56



Note

Connecting and Testing 100-Amphere Generator (Alternator) with Sun AGT-9/AGT-9A Test Stands.

FIGURE 3-57

3.8 Tactical Trucks

MODEL:

HMMWVs

SUBJECT:

HMMWV Starter

POC:

Ms. Jody McInerney, AMSTA-IM-MTA, DSN 786-7346, Commercial (810) 574-7346
mcinernj@cc.tacom.army.mil

DEFICIENCY:

Due to recent reports of problems with the HMMWV Starter, such as, loose starter bolts (from wrong bolts being used), front support bracket missing, and improper shimming, we are publishing this article. It contains the latest information related to HMMWV starter maintenance.

COMMENTS:

A. Order NSN 5305-01-285-4923, CAGE 34623, PN 5598856 to receive the correct bolt. This bolt should be 4-5/8 inches long (no more, no less) and a sealing compound pre-applied. You should torque these bolts to 30-40 lb-ft (41-54 N•m). If you get or have bolts that are the correct length but don't have loctite pre-applied, apply sealing compound NSN 8030-00-148-9833 before installing.

B. Make sure you have the starter mounting bracket installed. We are replacing the old bracket (NSN 2910-01-168-7873, PN (19207) 12338793) with a new bracket PN (19207) 12446777 (no NSN assigned yet). The new bracket's slot is positioned so that it cradles the stud.

Also, the original design used a locknut and washer to secure the starter to the mounting bracket. This locknut and washer is replaced by a serrated flanged hex locknut (NSN 5310-01-381-1471, PN (24617) 9411507). This locknut should be tightened to 15-19 lb-ft (20-26 N•m).

C. As far as using shims when installing the starter, you no longer have to note the size of shims for installation. You only need to install a .08 in (2 mm) shim on your starter. The PN/NSN for this shim is (19207) 12338789-2, NSN 5365-01-210-4903. Using the .08 shim will give you the proper gear mesh tolerance for starter pinion and flywheel gear.

D. If you would like to save time down the road, the next time you replace your starter, you may want to consider replacing the one-piece torque converter cover with a two-piece torque converter cover (NSN 5340-01-311-1633). It will save you about an hour and half of time the next time you replace your starter.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit

3-11. Tactical Trucks

MODEL:

M998 Series HMMWV

SUBJECT:

STARTER Replacement of Vehicles with ARCTIC HEATER Kit Installed

POC:

Ms. Kathy Catenaro, AMSTA-IM-MTA, DSN 786-7151,
Commercial (810) 574-7151
catenark@cc.tacom.army.mil

DEFICIENCY:

Starter removal is a Unit level task, and the Arctic Heater Oil Pan Shroud has to be removed to get at it.

Arctic Heater Oil Pan Shroud removal is presently listed as a DS task.

COMMENTS:

Removal of Arctic Heater Oil Pan Shroud is now authorized at Unit level. The TMs will be changed to reflect this authorization. The following procedures will be put in TM9-2320-280-20-2.

PROCEDURES:

ARCTIC HEATER OIL PAN SHROUD REPLACEMENT

This task covers:

a. Removal

b. Installation

Materials/Parts

Cotter pin (Appendix E, Item 8.1)
Nine nut and lockwasher assemblies
(Appendix E, Item 73.1)

Tools

General mechanic's tool kit:
automotive
(NSN 5180-00-177-7033)

WARNING

**Do not touch hot exhaust system components with bare hands.
Severe Injury will result.**

3-1 1. Tact. Trucks cont. a. Removal

1. Remove cotter pin (8) securing flex tube (7) to oil pan shroud (6) and disconnect flex tube (7). Discard cotter pin (8). (see figure 3-11)
2. Remove two nut and lockwasher assemblies (5) and washers (4) securing starter cable bracket (3), oil pan shroud (6), and washer (2) to oil pan (1). Discard nut and lockwasher assemblies (5).
3. Remove seven nut and lockwasher assemblies (9) and washers (10) securing oil pan shroud (6) to oil pan (1) and remove oil pan shroud from oil pan (1).

b. Installation

1. Install oil pan shroud (6) on oil pan (1) and secure with seven washers (10) and nut and lockwasher assemblies (9).
2. Secure washer (2), oil pan shroud (6), and starter cable bracket (3) to oil pan (1) with two washers (4) and nut and lockwasher assemblies (5).
3. Connect flex tube (7) to oil pan shroud (6) and secure with cotter pin (8).

PUBLICATIONS AFFECTED:

TM9-2320-280-34

TM9-2320-280-20

TM9-2320-280-20P

LEVEL OF MAINTENANCE:

Unit

All M998 and M998A1 Series HMMWV

SUBJECT:

Instrument Cluster Lamp and Lens

POC:

Leona Milas, AMSTA-IM-MTA, DSN 786-7346, Commercial (810) 574-7346
milasl@cc.tacom.army.mil

DEFICIENCY:

Reports from the field indicate the incandescent lamp for the instrument cluster light gets hot with prolonged use on high, causing the green lens to melt.

COMMENTS:

A Light Emitting Diode (LED), P/N 12460228, and clear lens, P/N 12339203-1, have been developed to replace the current lamp and green lens. The LED produces far less heat during operation, and is available in a kit, P/N 57K3238, which includes both the LED and the clear lens. Replacement of the lamp and lens can be accomplished in the field using the parts below and the procedures located in TM9-2320-280-20.

MATERIALS/PARTS:

Listed below is the replacement kit. Items in the kit may be ordered separately and are also listed.

<u>PART NUMBER</u>	<u>CAGE CODE</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
57K3238	19207	Kit, Lens and Lamp Replacement	A/R
12339203-1	19207	Lens (Part of Kit P/N 57K3238)	1
12460228	19207	LED (Part of Kit P/N 57K3238)	1

PUBLICATIONS AFFECTED:

TM9-2320-280-20-2
TM9-2320-280-20P
TM9-2320-280-34P

LEVEL OF MAINTENANCE:

Unit

8-7. Misc. Vehicles

MODEL:

All Army Vehicles

SUBJECT:

Repair of Master Light Switch, NSN 5930-00-307-8856

POC:

Mr. Darius Greene, AMSTA-MTB, DSN 786-7342,
Commercial (810) 574-7342

DEFICIENCY:

There are no repair procedures for the light switch and the field discards the switch when it fails.

COMMENTS:

Reports from the field indicates that the most common cause of the light switch failing is the build-up of corrosion on the internal contacts. Units may use the following procedures to remove the corrosion from the contacts and repair the switch.

PROCEDURES:

A. Remove switch from vehicle in accordance with the appropriate vehicle's TM.

NOTE

The light switch assembly contains small parts. Care should be taken when disassembling the switch assembly.

B. Remove screw securing the back cover to the switch.

C. Remove back cover from switch.

- 8-7. Misc. Vehicles cont.**
- D.** Remove three screws and control assembly from switch housing.
 - E.** Rotate disks to disengage the locking tabs and remove the locking clip.
 - F.** Taking care not to lose the electrical contacts, turn the switch assembly over so that the disks are on the bottom.
 - G.** Rotate and remove each disk, one at a time.
 - H.** Clean all terminals/contacts with emery cloth or steel wool.
 - I.** Reinstall disks and ensure that the locking tabs and clips are in place.
 - J.** Test switch for operation.(If the switch assembly does not operate properly, repeat steps E thru J). If still inoperative, discard light switch assembly.
 - K.** Remove lever stems from switch housing and insert in disks.
 - L.** Reinstall control assembly and three screws in switch housing.
 - M.** Reinstall cover and screw on switch assembly.
 - N.** Install switch assembly on vehicle in accordance with the procedures provided in the vehicle's TM.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit

8-3. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Brake Warning Lamp Stays On

POC:

COMMENTS:

We've recently added procedures for troubleshooting a brake warning lamp that stays on. Change 4 (dated 1 Nov 93) to TM9-2320-280-20-1 includes these procedures. But, we forgot to tell you where to find the procedures. (They start on page 2-282.2) We've also found an error in the procedures. Pencil in the following changes until we can get the TM fixed.

- (1) On page 2-264, block 4 reads, "Does the brake warning lamp operate properly? "If the answer is no, ~~Go to D, page 2-280~~ See note at right.
- (2) Make the following changes to the first note on page 2-265:

The brake warning lamp should come on when the engine is cranking, when the parking brake is set, or when there is a failure in the brake system. If brake warning lamp stays on, ~~bleed brake system (refer to para. 7-9). If problem persists, check proportioning valve (refer to page 2-365)~~ go to page 2-282.2. If the warning lamp doesn't come on, go to D, page 2-280.

- (3) Make the following changes to block 4, page 2-282.4:

Connect park brake switch. Make sure the parking brake is disengaged. Does the light stay ~~on?~~ off?

PUBLICATIONS AFFECTED:

TM9-2320-280-20-1

LEVEL OF MAINTENANCE:

Unit

3-9. Tactical Trucks

MODEL:
HMMWV

SUBJECT:
Brake Warning Lamp Removal and Installation Procedures

POC:
Mr. Ronald Hanebutt, AMSTA-IM-HLA, DSN 786-6215, Commercial (810)
574-6215
hanebutrC&cc.tacom.army.mit

DEFICIENCY:
The current maintenance procedures for removing and installing the brake warning lamp requires unnecessary tasks that consume an excessive amount of time.

COMMENTS:
Approval of a SMART Initiative has resulted in the development of procedures that will reduce the maintenance time required to replace the brake warning lamp from 1 hour to approximately 18 minutes.

MATERIALS/PARTS:

NSN
5980-01-187-0791

NOMENCIATURE
Light Emitting Diode, Red

PROCEDURES:
Removal:

WARNING

Disconnect battery ground cable before performing the following procedures. (Paragraph 4-73, TM9-2320-280-20-2)

1. Remove the two screws securing the air restriction gauge to bezel and pull gauge from behind the dash panel. Let the air restriction gauge hang.
2. Disconnect lead wires (67 and 27) of the brake warning lamp from the wiring harness.
3. Remove the two screws from the brake warning lamp and instrument panel.
4. Slide the brake warning lamp towards the steering column and down. Removal is Complete!

3-9. Tact. Trucks cont. Installation:

1. Install tape around the new lamp and lead wires (67 and 27). (see figure 3-7) Placing the tape around the lead wires enables the installer to keep the lamp in the proper position during installation.

NOTE

We found that tape works better for this application than twist or zip ties.

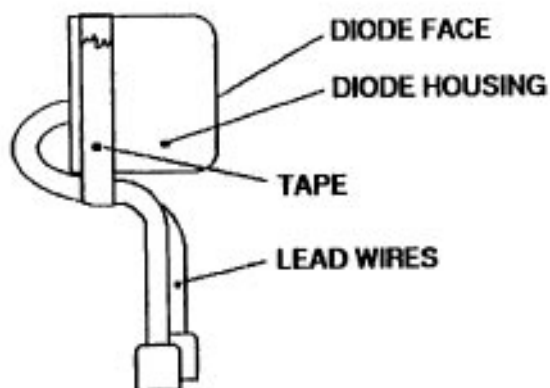


FIGURE 3-7

2. Maneuver the new brake warning lamp up along the steering column and to the left towards the mount location on the dash panel.
3. Install lamp on dash panel with two screws.
4. Connect lamp lead wires (67 and 27) to the wiring harness.
5. Install air restriction gauge behind dash panel on bezel with two screws.
6. Connect battery ground cable according to paragraph 4-73 of TM9-2320-280-20-2.

PUBLICATIONS AFFECTED:

TM9-2320-280-20-2

LEVEL OF MAINTENANCE:

Unit

8.2. Tactical Trucks

MODEL:

HMMWV M998 Series, M939, M809, M39 and 2 1/2 Ton Trucks

SUBJECT:

Rusted Headlight Assembly Retaining Rings, PN 8741446, NSN 5365-00-832-5650

POC:

Ms. Leona Milas, AMSTA-IM-HIA, DSN 786-5481,
Commercial (810) 574-5481
milasl@cc.tacom.army.mil

COMMENTS:

Water and condensation can accumulate in the bottom of the headlight assembly retaining ring causing a potential rust situation. To alleviate this problem, a small hole may be drilled in the retaining ring to allow water to drain out.

PROCEDURES:

1. Remove retaining ring according to TM.
2. Clean and remove dirt/rust conditions from surface of retaining ring.
3. Drill a 9/64 inch hole in the bottom of the ring, 3/4 inch from the inside edge of the ring. (see figure 8-1)
4. Paint all unprotected areas.(Refer to TM 43-0139).
5. Replace retaining ring.

PUBLICATIONS AFFECTED:

TM9-2320-280-20

TM9-2320-272-20

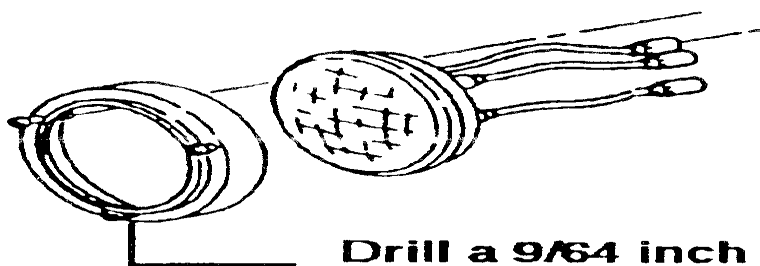
TM9-2320-260-20

TM9-2320-211-20

TM9-2320-361-20

LEVEL OF MAINTENANCE:

Unit



Drill a $\frac{9}{64}$ inch hole in the bottom center of the ring $\frac{3}{4}$ inch from inside edge.

FIGURE 8-1

8-2. Vehicles with Brakes cont.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

N/A

8-3. Tactical Trucks

MODEL:

All Tactical Vehicles

SUBJECT:

Taillight Lens, NSN 6220-01-359-2870

POC:

Lori Neal, AMSTA-FTMA, DSN 786-5703

DEFICIENCY:

We approved an Engineering Change Proposal (ECP) TAC 7300 which altered the composite material on Taillight Lens, NSN 6220-00-179-4324 from plastic to aluminum. The plastic and aluminum lens are not directly interchangeable. A plastic lens will only fit correctly on a plastic housing and the same is true of the aluminum lens.

COMMENTS:

We have assigned a new NSN for the plastic configuration, NSN 6220-01-359-2870, P/N 12375841. Deliveries from the contractor are expected to begin in August 1993.

PROCEDURES:

Advise all units to requisition NSN 6220-01-359-2870 when replacing the lens on plastic housings. NSN 6220-00-179-4324 should still be used when requisitioning the replacement lens for the aluminum housing.

PUBLICATIONS AFFECTED:

TM9-2320-262-20P

MIL-STD-1179

3-10. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Battery Box

POC:

Ms. Patricia Grashik, AMSTA-IM-HIA, DSN 786-5225, **Commercial**
(810) 574-5225 grashikp@cc.tacom.army.mil

COMMENTS:

We added a semi-annual inspection of the battery tray bolts and washers for corrosion. If corrosion is evident, wipe the bolts and/or washers clean. If the corrosion cannot be removed, or the surface of the bolt is pitted, replace the bolt and washer (TM9-2320-280-20-2, Para 4-80).

PUBLICATIONS AFFECTED:

TM9-2320-280-20-1

LEVEL OF MAINTENANCE:

Unit

8-3. Miscellaneous

MODEL:

All Military Standard Batteries

SUBJECT:

Repair of the Military Standard Battery

POC:

Mr. Clarence Woodard, AMSTA-MCB, DSN 786-7362, Commercial
(810) 574-7362 woodardc@cc.tacom.army.mil

DEFICIENCY:

TM9-6140-200-14, Page 4-2, Para 4-3 Battery Repair, does not state what batteries to use this repair procedure on.

COMMENTS:

The 6TL battery NSN 6140-01-210-1964 may not be repaired IAW these procedures listed in the TM because of the plastic case and hollow battery post, at this time there is no repair procedures for the plastic case or battery post, as soon as they become available they will be issued to the field.

PROCEDURES:

The procedures listed in TM9-6140-200-14 is to be used on the following batteries: 6TN (black) NSN 6140-00-053-2554, 2HN NSN 6140-00-053-2553 and 4HN NSN 6140-00-059-3528.

PUBLICATIONS AFFECTED:

TM9-6140-200-14

LEVEL OF MAINTENANCE:

Direct Support

3-12. Tactical Trucks

MODEL:
HMMWV

SUBJECT:
Slave Receptacle Mount

POC:
Mr. Eric Sutman, AMSTA-MTA, DSN 786-7151, Commercial (810) 574-7151

DEFICIENCY:

The HMMWV has a fiberglass mount for the slave receptacle. If the mount is broken, you can ground the positive terminal of the slave receptacle against the vehicle when connecting or disconnecting the slave cable. This could result in injury to personnel or damage to equipment.

COMMENTS:

A. We received a SMART initiative about this problem. To alleviate the problem of the mount breaking, the initiator recommended relocating and mounting the receptacle to the rear of the passenger's seat compartment. We looked at that idea, and we also considered changing the material of the mount, and improving the procedures for slave starting contained in TM9-2320-280-10.

B. We found that moving the receptacle isn't practical, and the material the mount is made out of is suitable for the HMMWV application. The best solution for reducing mount failures is to use a twisting motion when you connect the slave cable to, or remove it from, the receptacle.

C. Forcefully pushing the slave cable on, and pulling it off the receptacle can cause the mount to break. Using a twisting motion to put the cable on and take it off will help to reduce failures of the mount.

D. To prevent accidentally grounding the receptacle against the vehicle, always make sure the receptacle is in good condition. There are two types of slave receptacles used on the HMMWV. Older models have a rubber boot that insulates the receptacle. Make sure the boot is in place and serviceable before using the slave receptacle. The rubber boot will help to prevent accidental grounding. Newer HMMWVs have a one piece receptacle/cable assembly. The receptacle's terminals aren't exposed so you won't have a problem with accidental grounding.

3-12. Tact. Trucks cont.

PUBLICATIONS AFFECTED:

TM9-2320-280-10

LEVEL OF MAINTENANCE:

Operator

8-4. Miscellaneous

MODEL:

All Military Vehicles

SUBJECT:

Electronic Battery Tester

POC:

Mr. Clarence Woodard, AMSTA-IM-MCB, DSN 786-7362,
Commercial (810) 574-7362 Woodardc@cc.tacom.army.mil

EDITOR'S NOTE:

This is an updated article that supersedes the one published in TB 43-0001-39-6, dated Sep 93. The following are the changes that were made:

- new temperature compensation range*
- new charging / starting voltage*
- new voltmeter range*

8-4. Miscellaneous cont.

DEFICIENCY:

Unit maintenance does not have a good way to test batteries before they are turned in except for the hand held electrolyte tester.

COMMENTS:

This battery tester will allow the unit maintenance to perform a test before they turn in batteries as unserviceable. The *NSN* is 6625-01-032-4344 and the cost is approximately \$300.00 each, so before you order this item get your commanders approval. The following are the specifications of the battery tester:

Battery rating range	150 to 1,250 CCA
Temperature Compensation range	Battery below 32 degrees F. will read lower by 15 to 20 percent.
Battery Voltage	Automatic 6-12 volt systems
Charging/starting voltage	12 volt systems
Voltmeter range	0- 16 volts
Battery Condition Scale	Replace/Good (Red-Green)
Protective, custom mold carrying case	Standard

PUBLICATIONS AFFECTED:

TM9-6140-200-14

LEVEL OF MAINTENANCE:

Unit, Direct Support, General Support and Depot

3-24. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Water in Battery Tray.

POC:

Mr. Eric Sutman, AMSTA-MTA, DSN 786-7151

DEFICIENCY:

The battery tray drainage relief notch becomes clogged with debris allowing water to accumulate in the battery tray. If the water freezes it could damage the battery.

COMMENTS:

The PMCS in TM9-2320-280-10 includes a weekly procedure to clear debris from the battery box drain holes. In most cases, performing this procedure will keep water from accumulating in the battery tray.

If you're having problems with water collecting in the battery tray between PMCS services, it's OK to drill some holes in it. Remove the tray from the vehicle (TM9-2320-280-20). Drill four 1/2 inch holes in the battery tray. (see figure 3-41) This will help keep water from collecting between services. Don't drill extra holes in the battery box floor. There are enough drain holes there already. Drilling extra holes in the battery box floor could weaken the floor.

PUBLICATIONS AFFECTED:

TM9-2320-280-20

LEVEL OF MAINTENANCE:

Unit

MODEL:
HMMWV

SUBJECT:
Diagnosing Electrical System Failures.

POC:
Mr. Eric Sutman, AMSTA-MTA, DSN 786-7151

DEFICIENCY:
There is no protection against corrosion at the electrical ground point where wires 3C, 57A, and 79A are connected to the vehicle body. Corrosion at this point can cause problems in the HMMWV electrical system. Troubleshooting procedures can falsely identify these problems as failures of the PCB or glow plug controller.

COMMENTS:

A. When troubleshooting HMMWV electrical problems, always make sure the system you're working on is properly grounded. The troubleshooting procedures may tell you to replace the glow plug controller or the PCB when the problem is really a bad ground. The ground point is located on the firewall, behind the instrument cluster. Many of the HMMWV electrical systems, including the glow plug controller and the PCB, are grounded through this point. Before replacing any parts, clean the ground point to make sure the problem's not a bad ground. After cleaning and reassembling the ground point, cover both sides with RTV to protect it against corrosion.

B. Excessive failures of the PCB, glow plug controller and glow plugs might be an indication of a bad ground. After replacing failed components use the following procedures to make sure the system is properly grounded.

C. If you've experienced a problem like this on your HMMWV and these procedures help, we'd like to know about it. Give us a call or let your local TACOM LAR know.

Materials:

737 RTV	NSN 8030-01-328-0574
Anti-seize Compound	NSN 8030-00-155-6444
Nut and Lockwasher Assembly (2 ea.)	NSN 5310-01-252-2999

3-28. Tactical Trucks
cont.

PROCEDURE:

- A.** Remove instrument panel (1). (refer to TM9-2320-280-20-2, paragraph 4-12) (see figure 3-77)
- B.** Remove nut and lockwasher assembly (3) securing engine harness ground lead 3C (4) to body (2). Remove nut and lockwasher assembly (5) and capscrew (7) securing harness ground leads 57A (6) and 79A (8) to body (2). Discard nut and lockwasher assemblies (3) and (5).
- C.** Inspect and clean wires and connection points.
- D.** Apply antiseize compound to harness leads 57A (6) and 79A (8) and secure to body (2) with capscrew (7) and nut and lockwasher assembly (5). Apply antiseize compound to engine harness ground lead 3C (4) and secure to body (2) with nut and lockwasher assembly (3).
- E.** Cover leads 3C (4), 57A (6), and 79A (8) with RTV.
- F.** Install instrument panel (1). (refer to TM9-2320-280-20-2, paragraph 4-12)

PUBLICATIONS AFFECTED:

TM9-2320-280-20-1

TM9-2320-280-34

LEVEL OF MAINTENANCE:

Unit

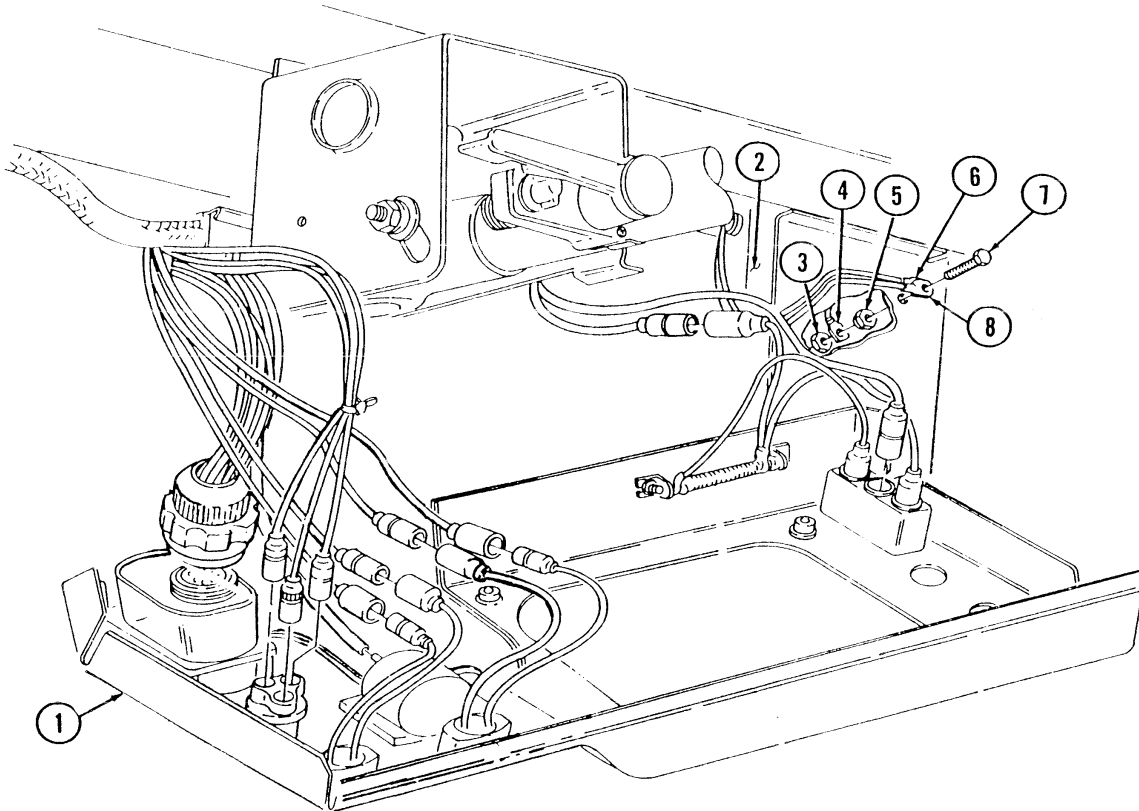
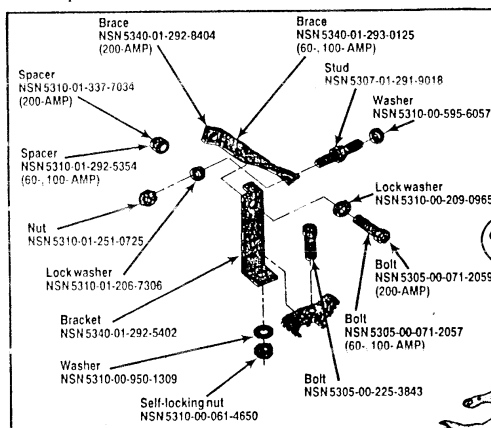


FIGURE 3-77

BREAK THE BROKEN BOLT SYNDROME

Mechanics, broken bolts on your HMMWV's alternator bracket are bad luck at the best of times.

The next time those bolts break, turn your luck around by installing a new bracket assembly with improved mounting hardware. The kit for 60- and 100-amp alternators comes with NSN 2540-01-288-5240. NSN 2540-01-288-8567 gets the 200-amp alternator kit.



Both kits come with a better rear support brace that runs from the back of the alternator to the exhaust manifold.

Make sure you replace all the old hardware when you change the brackets.

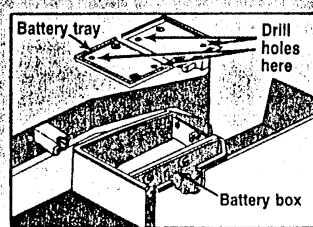
DRAIN BATTERY TRAY

Dear Editor,

We've found water pooling up in HMMWV battery trays. In winter, this water freezes, damaging batteries.

We get rid of it by drilling a 5/16-in drain hole in the lowest part of the tray.

Billy J. Morgan
Ft McClellan, AL



FROM THE DESK OF THE Editor

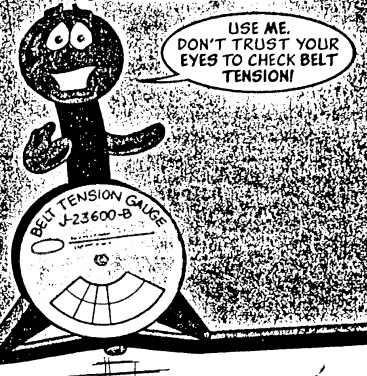
Good work, Sir. That'll keep your batteries dry. Tank-Automotive Command suggests even more holes. After removing the trays from the HMMWV, drill four 1/2-in holes, as shown. Do not drill any holes in the metal battery box.

HMMWV...

CARE FOR BOLTS AND BELTS

Too tight's not right for alternator belts, mechanics. Tight belts lead to broken mounting bolts.

Your eyes won't tell you how tight belts are. Belts as long as these will flap and seem loose. Trying to tighten them just puts extra strain on mounting bracket bolts. When one bolt breaks, others will follow.

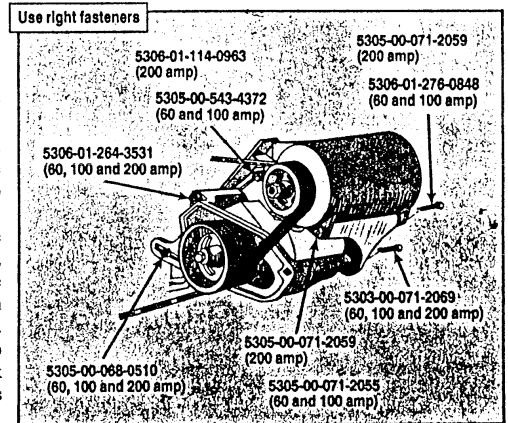


If you suspect loose belts, use the belt tension gauge, NSN 6635-01-093-3710, in your HMMWV's special tools list. Procedures are in Para 3-75 of TM 9-2320-280-20-2.

If you have to tighten belts, remember to torque all capscrews to 40 lb-ft and no more. Extra muscle on these fasteners can snap them off.

Always use the right fasteners, too. Using the wrong ones can lead to problems. One that's too weak can break off when torque is applied.

PS 508



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MAR 95

06-55

HMMWV...

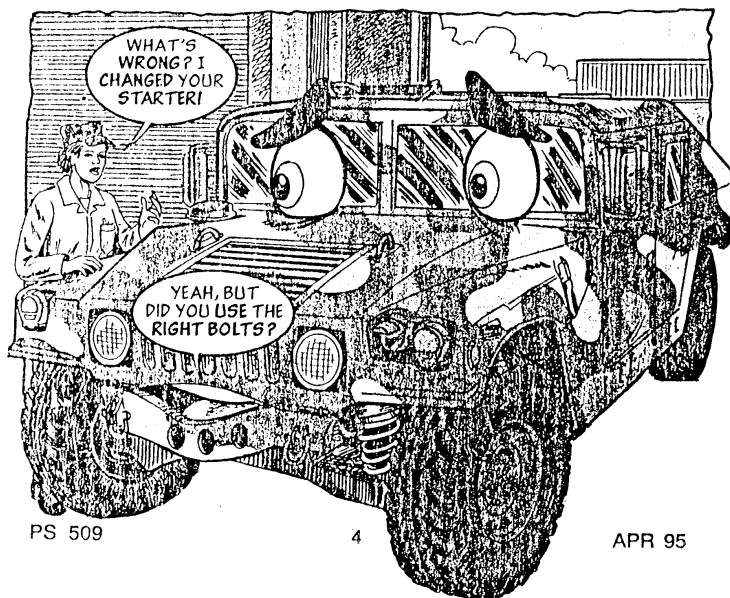
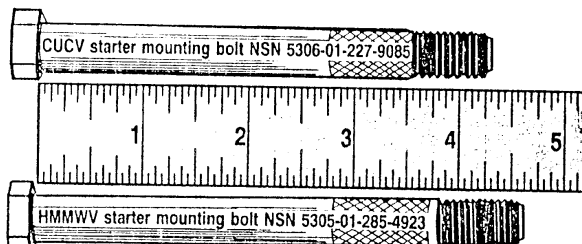
Get the Right Starter Bolt

Forget everything you've been told about ordering starter mounting bolts for your HMMWV.

You need a bolt that's 4 5/8 inches long — no more, no less. Order it using NSN 5305-01-285-4923.

Even when you receive the bolt, get out your trusty ruler and measure it before you install it in the starter.

Never use the CUCV starter bolt, NSN 5306-01-227-9085, on the HMMWV. They're only 4 5/16 inches long. That means you'll only have about three threads holding the starter to the engine block. It's not enough.



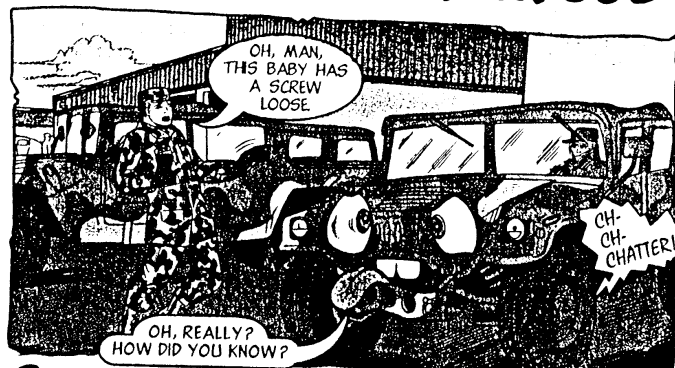
PS 509

4

APR 95

HMMWV...

FINISH THE STARTER JOB



Replacing the starter on your Humvee is a re-bolting experience, mechanics. You've got to use the right fasteners — and use them all.



Loose or missing fasteners let the starter move as it engages with the fly-wheel gear. That causes starter chatter and grinds down gears.

Always use a new locknut, NSN 5310-00-935-9021. It doesn't have the same gripping power the second time.

The capscrew called out in your parts TM, NSN 5306-01-301-0523, is coded as a terminal item on the AMDF. If you still have some around, use them. Put sealing compound, NSN

8030-00-148-9833, on the threads before installing them.

If you need new capscrews, order them on a DD Form 1348-6 using CAGE 34623, PN 5598856 from S9C.

Torque the capscrews to 36-44 lb-ft and the locknut to 22-26 lb-ft.



PS 494

6

JAN 94

One Thing Leads to Another

Mechanics, instead of guessing when you adjust your HMMWV's alternator belt, use the tension gauge, NSN 6635-01-093-3710, from the special tools list in TM 9-2320-280-20P.

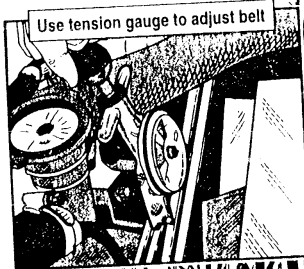
If the belts aren't adjusted right, your troubles are just starting.

A **too-loose belt** vibrates and loosens the bolts holding the alternator mounting and support brackets.

A **too-tight belt** puts pressure on bolts, and alternator and power steering shafts and breaks them off.

Once a bolt is loose or broken, the drive belts pull unevenly and twist other bolts and brackets. The brackets crack and bolts snap off in the engine.

New and used belts require different tensions. Always follow the belt tension chart in Para 3-75 of TM 9-2320-280-20-2.



To remove this section, bend staples up, remove Pages 27-34, then re-close staples.

Batteries...

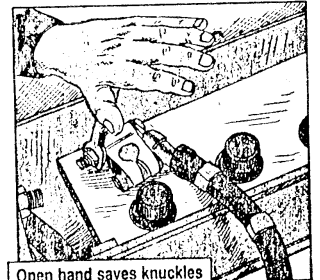
POSITIVE FIRST? NEGATIVE



It pays to think positive, unless you're removing a vehicle's battery. Thinking negative then could save your life.

If you loosen the positive cable first, and your wrench touches a ground—ZAP! Current goes through the wrench to you. That can mean a bad burn—or worse.

The solution is to remove the negative side first. Then, there's no path for the electricity to get to you if you do hit ground while removing the positive side.



Use Open Hand

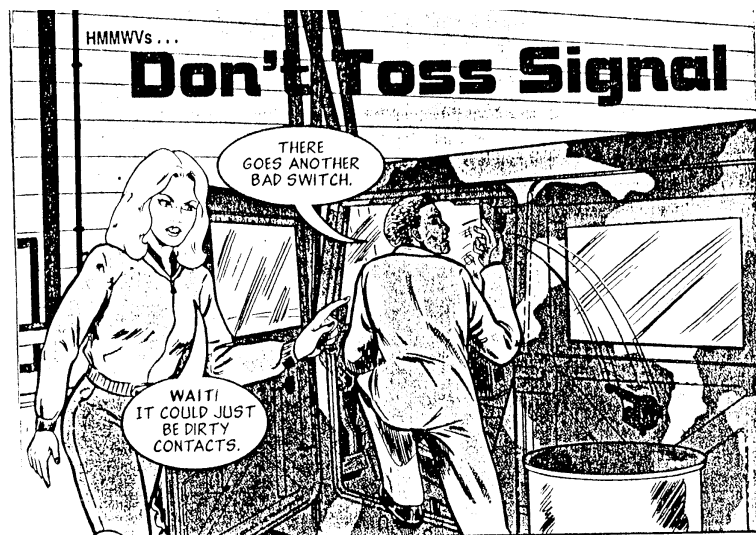
Save a bunch of skinned knuckles when you're working with batteries and such by pushing a wrench with your palm open. Your knuckles will be out of the way if the wrench slips off the nut.

PS 513

20

AUG 95

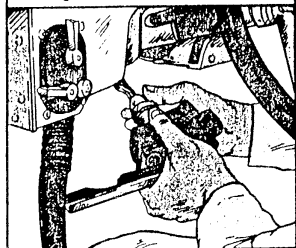
06-57



Chances are, mechanics, you're tossing good turn signal switches when the contacts are just plain dirty or corroded. Put some life back into the switch, NSN 6220-01-322-2271, like so:

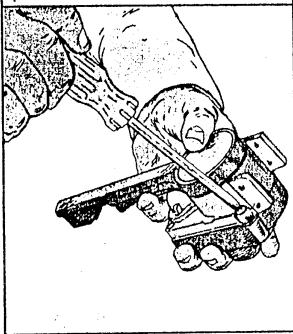
1. Disconnect the battery ground.

2. Disconnect the switch from the steering column.



3. Disconnect the wiring harness plug from the switch.

4. Remove the four screws from the signal arm plate, and then remove the plate.

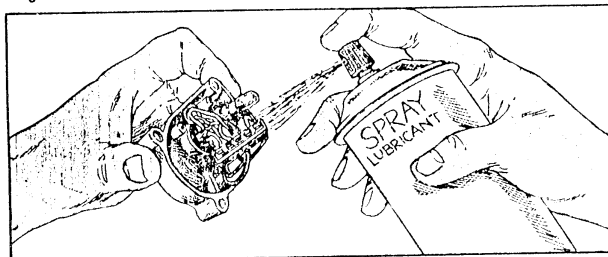


52

DEC 93

Switch Just Yet

5. Spray the switch's contacts with spray lubricant cleaner, NSN 6850-00-003-5295. The cleaner has an alcohol base that dries quickly. Do not sand the contacts with sandpaper or an emery board. That only removes the contact's protective coating that fights corrosion.



6. After cleaning, reassemble the switch and install it. If your truck's turn signal still doesn't work, replace the switch.

Tactical Vehicles ...

Water Means Lights Out

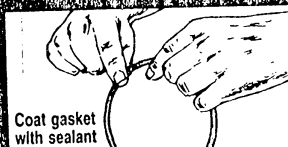
Blackout drive lamps really do black out if moisture gets inside.

Water trapped inside the assembly creates rust or shorts, both of which will turn out the lights.

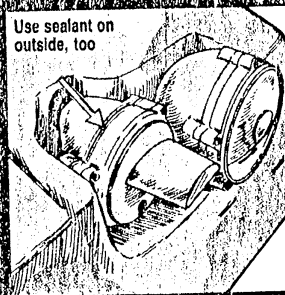
Keep moisture out by using a new gasket each time you replace a bulb. Coat the new gasket with joint sealing compound, NSN 3040-00-8436563.

Run a coat of the sealer around the outside of the light too, where the assembly goes together.

Use sealant on outside, too



Coat gasket with sealant



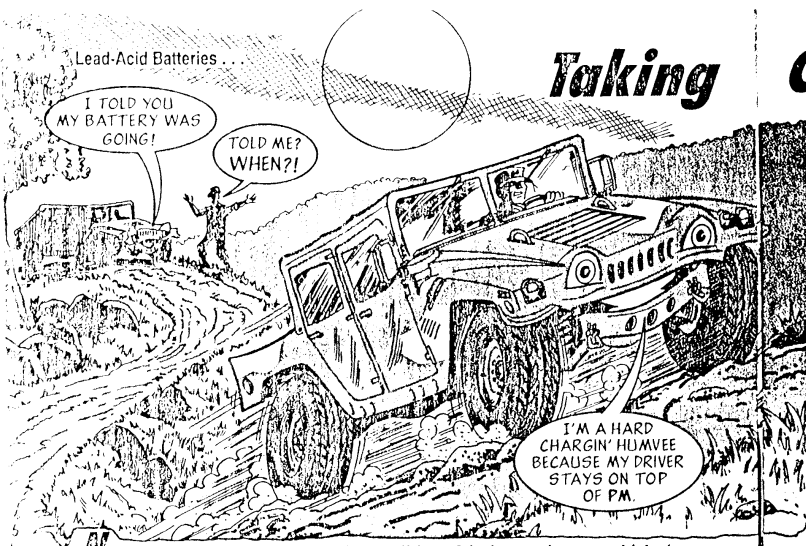
PS 496

55

MAR 94

26-58

Taking Charge of PM



Lead-Acid Batteries

I TOLD YOU MY BATTERY WAS GOING!

TOLD ME? WHEN?!

I'M A HARD CHARGIN' HUMVEE BECAUSE MY DRIVER STAYS ON TOP OF PM.

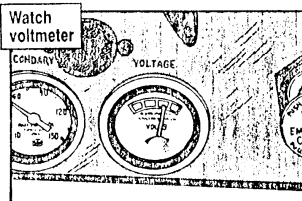
Nobody has a better idea of the daily condition of the battery in your vehicle than you, the operator.

Most vehicles have either a voltmeter or BAT-GEN indicator. By watching this gauge you can get a good picture of the shape the batteries are in. The gauge tips you off to trouble, so you can tip off your mechanic that the batteries need a maintenance going-over.

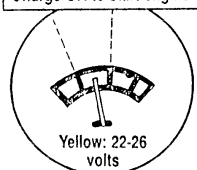
Before you take these readings, turn off all electricity users. Then, it's just the battery and your alternator showing up on the gauge.

Condition Is Color Coded

Watch the gauge when you turn the switch ON and before you crank up the engine. The gauge should hang in the yellow section, or between 22-26 volts. If the needle goes into the red at the left of the meter, your batteries are weak, defective, need charging or there's a short in the system.



Charge OK to start engine



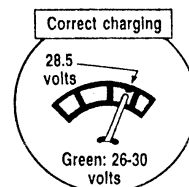
PS 500

6

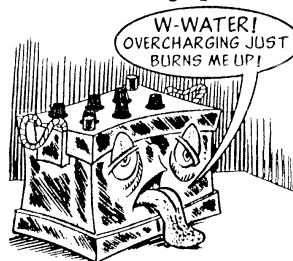
JUL 94

Now, crank up the engine. If the needle hangs to the left after you've started the engine, one battery could have a bad cell.

After the engine starts, run it at fast idle—about 1,500 RPM. The battery charging system's working OK if the needle settles at about 28.5 volts, shown by the notch in the green section.



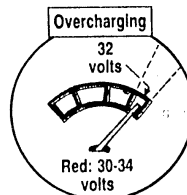
Overcharging



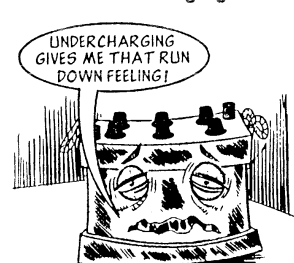
Overcharging's the culprit when the needle hangs in the right (red) part of the gauge.

High voltage means water will boil out of the batteries and the plates inside can be damaged. (Another clue to overcharging is a battery that often needs water.)

If the gauge shows a high rate of charge when the engine's been running for 30 minutes, there's a good chance the battery's being cooked to death.

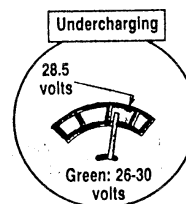


Undercharging



Undercharging is the villain when the needle settles well below that 28.5 volt mark, even though it's still in the green.

Have any of these problems? Get your mechanic to check out the charging system.



7

JUL 94

Lead-Acid Batteries

AS EASY AS

ONE-TWO-THREE

Take care of the little things (like doing PM on lead-acid batteries) and the big things (like starting problems) will take care of themselves.

THE BIG THREE OF "LITTLE THINGS" TO TAKE CARE OF ON BATTERIES ARE WATER, CLEANING AND PROTECTION.

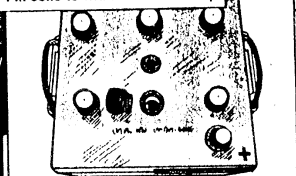
1. Make sure battery plates are covered with electrolyte by adding distilled water when needed.

The chemical action between the electrolyte and the cell plates produces electricity. Without it, batteries discharge and die.

Remember, more is not better. Too much water—like filling cells to the top—is just as bad as too little. When the cell is too full, electrolyte is flushed out during charging. Since the battery can't recharge itself, it dies. Fill cells with distilled water to within 1/4 inch of the filler cap necks.

PS 523

Fill cells to within 1/4 inch of top



You can get six 1-gal bottles of distilled water with NSN 6810-00-682-6867. Get one 5-gal bottle with NSN 6810-00-356-4936.

In a pinch—to save the battery—rainwater, air conditioner condensation or even tap water will do. Filter it through a clean cloth before using it, though.

Fill the battery using battery filler syringe, NSN 6140-00-643-4492. Carry a supply of water in battery filler, gravity, NSN 6140-00-635-3824. Both items are in the Common shop sets.

2

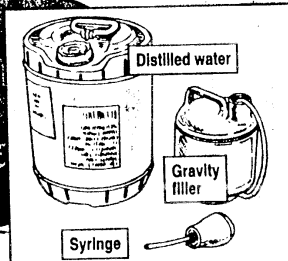
JUN 96

I CAN'T BELIEVE THE BATTERY'S DEAD!

THAT'S BECAUSE...

...YOU FORGOT...

...ABOUT US!



Even with the syringe, you can overfill, so be careful.

In hot weather, electrolyte expands. If batteries were full at cooler temps, they'll be overfull when it's hot. You can remove water with the syringe, too.

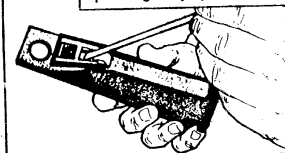
Run the engine for 15 minutes after adding water in freezing temperatures. The charging system will then mix the water and electrolyte. A fully charged battery won't freeze down to -90° F.

You can tell how much charge a battery has by measuring the electrolyte's specific gravity.

PS 523

Use the tester, antifreeze and battery, NSN 6630-00-105-1418. The right charge is shown by a specific gravity reading of 1.280.

Make sure you have correct specific gravity by using tester



Put the battery tester to work when:

- ⊕ Pulling the equipment's semiannual service.

- ⊖ You suspect acid was flooded but by overfilling with water.

- ⊕ You're troubleshooting the charging system.

- ⊖ Cold weather is just around the corner.

- ⊕ You're putting the battery into service for the first time.

Instructions are on the tester, but more information is printed on Pages 3-2 through 3-8 of TM 9-6140-200-14.

3

PS MORE

2. Keep dirt and corrosion cleaned off.

Corrosion eats up metal parts on and around batteries. Dirt and corrosion also hold moisture. This moisture can close the circuit between the positive and negative terminals and discharge your battery.

SCRAM, YOU DIRTBALLS AND CORROSION CREEPS!



Wipe off light dirt and corrosion with a cloth. To fight heavy corrosion, take out the battery and any metal parts that can be removed. Scrub the battery with a baking soda and water mix. Mix 1/2 pound of soda in a gallon of water. A pound of baking soda is NSN 6810-00-264-6618. Get 100 pounds with NSN 6810-00-290-5574.

PS 523



Use wire brush to scrape off rust and old paint



Soak metal parts in the mix, then use a wire brush to scrape off rust and old paint. Use a torch and scraper, if necessary, but only on the metal parts you've removed.

Work with the torch only in places where there's no danger of fire. Keep it away from the battery, too. It can explode.

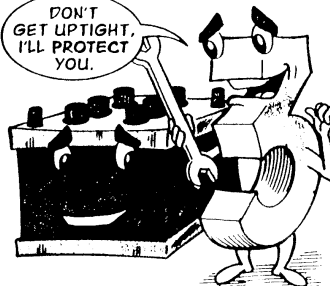
After cleaning, rinse with lots of clean water and dry well. Protect bare metal with bituminous coating compound, NSN 8030-00-290-5141. Shine up battery posts and clamps with brush, battery terminal, NSN 5120-00-926-5175.

4

JUN 96

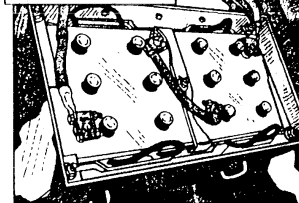
3. Protect against damage.

DON'T GET UPTIGHT, I'LL PROTECT YOU.

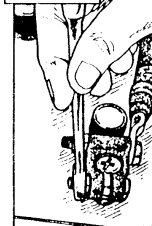


Snug battery hold-downs tight enough to keep the battery from banging around, but not enough to crack it.

Keep hold-downs tight



Use correct size wrench



Protect terminals and cable connectors, too. Always use the right-size wrenches, not an adjustable wrench, when loosening or tightening nuts.

PS 523

Never overtighten connectors. That can stretch the clamps and loosen the connector's grip.

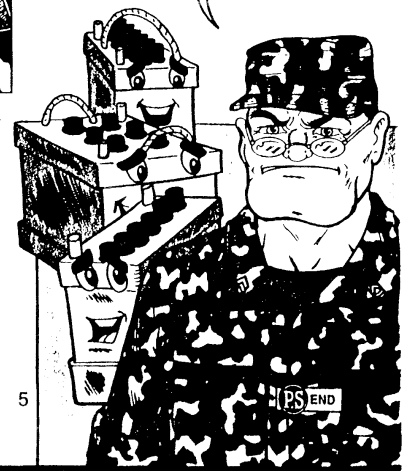
Loosen the bolt to remove the connector. Never pry it off with a screwdriver. Chances are you'll break the battery post.

Assure tightness of battery connectors visually or with an easy touch, not with a pair of pliers or other tools.

Support long cables with tiedown straps, NSN 5957-00-074-2072.

When you change a cable, remove the bolt and the cable only. Leave the terminal connected to the battery post. That keeps your connection secure.

IF YOU DO THESE LITTLE THINGS, AND FOLLOW THROUGH ON PROBLEMS REPORTED BY THE OPERATORS, BATTERIES WILL LIVE A LONG AND PRODUCTIVE LIFE.



5

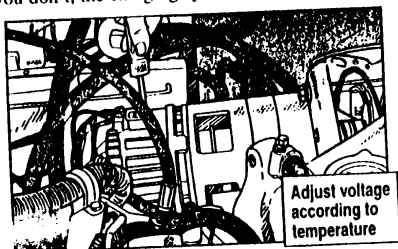
Lead-Acid Batteries...

Drop Voltage in the Heat

Mechanics, if your unit is going to operate where the temperature is 95 degrees or higher every day, adjust the voltage on generators and alternators to the minimum charging rate. If you don't, the charging system will overheat and ruin batteries.

The minimum charging rate varies from vehicle to vehicle, but it is about 26.5 volts. See your equipment's TM for the exact charging rate.

Of course, some generators and alternators can't be adjusted. Have operators keep an eye on the battery gauge on those vehicles. If the gauge needle goes into red, they should report it.



HMMWV...

Add Battery Drains

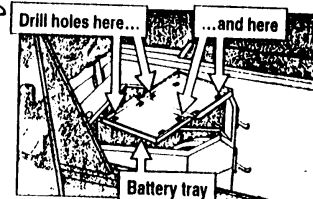


IF WATER POOLS IN THE BATTERY TRAY, DRILL SOME HOLES TO LET IT OUT.

Remove the tray and drill four 1/2-in holes in the corners where there are no mount bolts. Do not drill holes in the metal battery box underneath the tray.

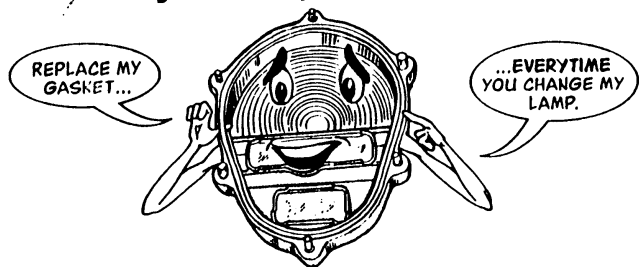
You don't want water pooling around the batteries, because it causes corrosion in the summer and damage when it freezes in winter.

If the holes are already there and just plugged up, open them with a stick or pencil until the water runs out.



Composite Lights...

Penny Saved, Dollar Burned!



Pennies saved usually turn into dollars saved. Sometimes, though, saved pennies turn into waste dollars.

Like trying to save the cost of a new gasket when you replace a turn signal, stop, tail, parking or blackout marker lamp in a composite light.

If you use the old gasket again, water will get into the assembly and cause rust that freezes the lamp base to the socket. You'll end up doing the job all over again-- and spending more maintenance dollars.

It's smarter and cheaper in the long run to use a new gasket each time you open the light.

PS 525

26

AUG 96

HMMWV Alternator Bracket Mod

Put an end to broken brackets or stripped threads on your HMMWV's alternator using plans in TB 43-0001-39-7 (Dec 95) that help you change the alternator bracket from a two-bolt design to a one-through-bolt design. Get Pages 3-19 through 3-26 of the TB from your local TACOM LAR or from Half-Mast.

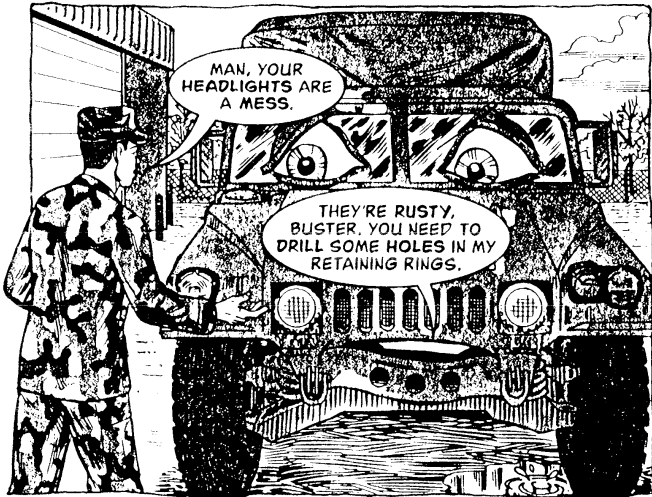
PS 528

23

NOV 96

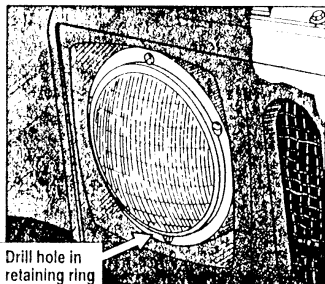
HMMWV ...

Let the Water Out



If rust is attacking the headlight retaining rings on your HMMWVs (or any other wheeled vehicle, for that matter), take a drill to the rings.

A $\frac{3}{16}$ -in hole drilled $\frac{1}{4}$ inch from the inside edge of the ring drains water trapped between the headlight mount and the ring.



PS 527

7

OCT 96

Course, you'll need to remove the ring, clean the area where you're going to drill, and then paint the area after you've finished drilling.

Use NSN 8010-01-229-7546 to get a 1-qt can of CARC topcoat for the painting.

This procedure will work on any vehicle that uses headlight retaining ring, NSN 5365-00-832-5650.

WHEELED VEHICLES

Tactical Trucks ...

Composite Lights vs. Water



The natural born loser in the battle between moisture and any electrical device is the device. So it is with the front and rear composite lights on tactical trucks.

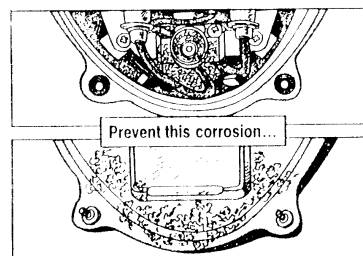
Units replace too many lamps and other light components that have shorted or rusted out because moisture got in where it didn't belong. And most often the reason moisture gets to do its dirty work is a bad gasket.

Never, ever reuse a gasket when you replace a turn signal, stop, tail, parking or blackout marker lamp in a composite light.

Carefully install a new gasket so there are no pinch points or gaps when the screws are tightened. There'll be leaks anywhere the gasket does not make a good seal.

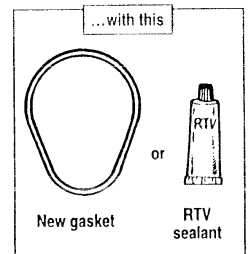
If you've never had success with gaskets no matter how hard you've tried, put a seam of RTV sealant, NSN 8040-00-728-3088, around the light.

You'll have a little more work to do to clean the sealant off next time you work on the light, but chances are that next time will be much further off than what you're used to.



PS 529

8



DEC 96

Chapter 07

TRANSMISSION

Functional
Group Code
0705-0708

8-3. Misc. Vehicles

MODEL:

Any Vehicle that uses Dexron II

SUBJECT:

New Automatic Transmission Fluid, Dexron III

POC:

Mrs. Landis Kazsuk, AMSTA-IM-H, DSN 786-8507, Commercial (810)
574-8507 kazsuk@cc.tacom.army.mil

DEFICEENCY:

Dexron II is being replaced with Dexron III.

COMMENTS:

A. Dexron III is the new version of Dexron II. You will derive several benefits from using Dexron III in your transmission: higher flash and fire points, lower foaming, increased thermal stability, greater oxidation stability, improved friction performance, and better corrosion resistance. As a result, equipment performance will improve and service life will lengthen.

B. Use the following National Stock Numbers (NSN) to order Dexron III:

9150-01-353-4799	1 Quart Plastic Bottle
9150-01-114-9968	55 Gallon Drum

C. If your system is designed for Dexron III (your Technical Manuals, Lubrication Instructions and Lubrication Orders identify Dexron III as the required product) you **MUST** use Dexron III. However, if you are currently using Dexron II in your system, adding Dexron III to it will not harm it. You do not have to flush Dexron II out of the system before you add Dexron III to it.

D. Dexron II is no longer manufactured and when the existing stock is exhausted, only Dexron III will be available. In an effort to deplete the inventory, Supply may force issue Dexron II. So if you order Dexron III, you may receive Dexron II. To prevent this from happening, use Advice Code 2B and the NSNs for Dexron III stated above.

8-3. Misc. Vehs. Cont. **E.** Until the supply is gone, you can still order Dexron II by using the following NSNs:

9150-00-698-2382

1 Quart Can

9150-00-657-4959

5 Gallon Can

PUBLICATIONS AFFECTED:

All that contain Dexron II NSNs

LEVEL OF MAINTENANCE:

All levels

3-12. Tactical Trucks

MODEL:

M998A2 Series Vehicles

SUBJECT:

Replacement of 1995 4L80E Transmission (NSN 2520-01-399-4691) and/or 1995 Transmission Control Module (TCM) E-Prom (NSN 5962-01- 430-0182)

POC:

Ms. Patricia Grashik, AMSTA-IM-HLA, DSN 786-7566, Commercial (810) 574-7566 grashikp@cc.tacom.army.mil

DEFICIENCY:

The 1995 4L80E transmission used in M998A2 series vehicles is no longer in production and only five will be available when the vehicles are fielded. TM9-2320-280 series maintenance manuals do not contain E-Prom replacement procedures.

COMMENTS:

A. When it is necessary to replace the 1995 4L80E transmission, use transmission replacement kit (19207) 57K3502, NSN 2520-01-430-5274. The replacement kit includes the 1996 4L80E transmission and 1996 calibrated E-Prom.

NOMENCLATURE

CAGE/PART NO.

NSN

1996 Transmission

(16764)24205114

2520-01-430-2765

1996 E-Prom

(16764)16229203

5962-01-430-0208

B. It is necessary to replace the E-Prom located inside the TCM due to changes in the transmission shift points. The TCM controls transmission shift points and sequence based on signals from engine and transmission sensors. The E-Prom is the "brain" of the TCM and is uniquely calibrated to its matching production year transmission to interpret transmission shift points and sensors.

C. GM informed us they will not supply the inner module assembly of the TCM part number (16764) 16197359, NSN 5930-01-430-4541. The inner module assembly consists of a terminal box, circuit cards and E-Proms. Since we cannot get the TCM module complete, we have provisioned the terminal box, with the circuit cards installed, and E-Proms separately. Also, since E-Prom replacement procedures are not in the revision to TM9-2320-280 series manuals, we developed the following procedures.

3-12. Tact. Trucks cont.

MATERIALS/PARTS:

<u>NOMENCLATURE</u>	<u>NSN/PART NO.</u>	<u>QTY</u>
1995 E-Prom	5962-01-430-0182	1
or		
1996 E-Prom	5962-01-430-0208	1
RTV Adhesive Sealant	8040-00-938-1535	AR
*Screw, Captive, M6 x 1.0-25 MM	(5A910) 01620290	4
*Screw, Machine M3.5 x 0.6-9 MM	(39375)16074380	2
Module, Transmission w/circuit cards	5940-01-430-2764	1

*Not available through the supply system yet. Provisioning actions on-going. Anticipate availability through the supply system 2nd Qtr FY97.

PROCEDURES:**A. E-Prom Removal:**

1. Disconnect negative battery cables. (Refer to TM9-2320-280-20.)
2. Remove left rear seat. (Refer to TM9-2320-280-20.)
3. Loosen four screws (1) and remove cover (2) and foam insulation (4) from TCM box (8). (see figure 3-23)
4. Remove two screws (5) and access panel (6) from terminal box (9).
5. Disconnect E-Prom (10) from circuit board (7). Discard E-Prom.

B. E-Prom Installation Procedures:**NOTE**

For proper calibration of E-Prom to transmission, ensure E-Prom is the same production year as the transmission installed in vehicle.

1. Install E-Prom (10) on circuit board (7). (see figure 3-23)
2. Install access panel (6) on terminal box (9) with two existing screws (5).
3. Clean sealant from TCM box (8) and cover (2).
4. Apply 1/8-in. bead of NSN 8040-00-938-1535 RTV adhesive sealant in groove (3) on cover (2).
5. Install foam insulation (4) and cover (2) on TCM box (8) and tighten four existing screws (1). Tighten screws (1) to 30 lb-in (3 N•m).

- 3-12. **Tact. Trucks cont.**
6. Install left rear seat. (Refer to TM9-2320-280-20).
 7. Connect negative battery cables. (Refer to TM9-2320-280-20.)

NOTE

To replace the terminal box, disconnect input plug and test plug and remove terminal box from TCM.

PUBLICATIONS AFFECTED:

TM9-2320-280-20

TM9-2320-280-24P

LEVEL OF MAINTENANCE:

Unit

3-13. Tactical Trucks

MODEL:

All HMMWVs

SUBJECT:

Transmission Modulator Assembly

POC:

Ms. Jody McInerney, AMSTA-MTA, (810)574-7346

3-13. Tact. Trucks cont.

COMMENTS:

Currently, the replacement and adjustment procedures of the transmission modulator assembly is at Direct Support. However, due to a SMART initiative, we are changing the authority level to replace and adjust the transmission modulator assembly to Unit Level maintenance. Below are the procedures needed to perform this task:

PROCEDURE:**MODULATOR ASSEMBLY REPLACEMENT**

This task covers:

A. Removal**INITIAL SETUP**Tools

General mechanic's tool kit:
automotive (NSN 5180-00-177-7033)

removed

Materials/Parts

"O" ring seal
NSN 5330-01-043-5572

Manual References

TM9-2320-280-10
TM9-2320-280-20

B. InstallationEquipment Condition

*Hood raised and secured
(TM9-2320-280-10)
*Engine access cover

(TM9-2320-280-20)

General Safety Instructions

Allow transmission to cool
before performing this task.

Maintenance Level

Unit

A. Removal

WARNING

Allow transmission to cool before performing this task. Failure to do this may cause injury.

- 3-13. Tact. Trucks cont.**
1. Pull off cable clip (6) from modulator control rod head (3).
 2. Loosen mounting nuts (8) and (4) securing modulator cable (7) to cable bracket (1) and remove cable (7) and washer (5) from bracket (1).
 3. Underneath vehicle, remove capscrew (11) and modulator retaining clip (12) from transmission (13).

NOTE

Have drainage container ready to catch fluid.

4. Remove modulator (10) and "O" ring seal (14) from transmission (13). Discard "O" ring seal (14).

B. Installation

1. Install "O" ring seal (14) on modulator (10) and install modulator (10) in transmission (13).
2. Install modulator retaining clip (12) on transmission (13) and secure with capscrew (11). Tighten capscrew (11) to 18 lb-ft (24 N.m).

NOTE

Do not tighten mounting nuts.

3. Position modulator cable (7) through cable bracket (1) and install washer (5) and start mounting nut (4).

CAUTION

Ensure cable is clear of exhaust system or other sources of extreme heat to prevent damage to equipment.

4. Pull modulator control rod (2) to the rear until stop is engaged and hold in position.
5. With modulator cable core (9) in idle position (cable core (9) is extended) adjust modulator mounting nuts (4) and (8) until modulator control rod head (3) and cable clip (6) aline.

- 3-13. **Tact. Trucks cont.**
6. Tighten mounting nuts (4) and (8) and recheck alignment. Readjust if alignment has changed.
 7. Pull modulator cable core (9) outward and connect cable clip (6) to modulator control rod head(3).
 8. Check modulator cable (7) for ease and smoothness of operation and ensure cable core (9) returns to the idle position.

FOR ILLUSTRATION - - SEE TM9-2320-280-34, PARAGRAPH 7-4, PAGE 7-5

FOLLOW ON TASKS: Install engine access cover
(TM9-2320-280-20).
Fill transmission to proper fluid level
(TM9-2320-280-10)

Lower and secure hood (TM9-2320-280-10)
Road test and check for proper operation
(see below)

TRANSMISSION ROAD TEST

This task covers:
Road Test

INITIAL SETUP

Tools

General mechanic's tool kit:
automotive (NSN 5180-00-177-7033)

Equipment Condition

Transmission fluid at proper level
(TM9-2320-280-10)
Adjust manual shift linkage

(TM9-2320-280-20)
Adjust modulator cable
(see above)

Manual References
TM9-2320-280-10
TM9-2320-280-20

Maintenance Level
Unit

3-13. Tact. Trucks cont.

ROAD TEST

1. Position transmission shift lever in "D" (drive) and accelerate vehicle from 0 mph. A 1-2 and 2-3 shift should occur at all throttle openings. Shift points will vary with throttle openings. Allow vehicle to decrease in speed to 0 mph and 3-2 and 2-1 shifts should occur.
2. Position transmission shift lever in "2" (low 2) and accelerate from 0 mph. A 1-2 shift should occur at all throttle openings (no 2-3 shift can be obtained in this range). The 1-2 shift in "2" (low 2) is somewhat firmer than in "D" (drive). This is normal.
3. Position transmission shift lever in "1" (low 1) and accelerate the vehicle from 0 mph. No upshift should occur in this range.
4. Position transmission shift lever in "D" (drive) and with the vehicle speed at approximately 35 mph, close throttle and move transmission shift lever to "2" (low 2). Transmission should downshift to 2nd gear. An increase in engine rpm and an engine braking effect should be noticed.
5. Position transmission shift lever in "2" (low 2) and with vehicle speed at approximately 25 mph, close throttle and move transmission shift lever to "1" (low 1). Transmission should downshift to 1st gear. An increase in engine rpm and engine braking effect should be noticed.
6. Position transmission shift lever in "R" (reverse) and check for reverse operation.

PUBLICATIONS AFFECTED:

TM9-2320-280-20
TM9-2320-280-20P

TM9-2320-280-34
TM9-2320-280-34P

LEVEL OF MAINTENANCE:
Unit

4-4. Tactical Trucks

MODEL:
HMMWV

SUBJECT:
Transmission Gear Shift and Release Button

POC:
Ms. Jody McInerney, AMSTA-IM-MTA, DSN 786-7346,
Commercial (810) 574-7346 mcinernj@cc.tacom.army.mil

DEFICIENCY:
Transmission gear shift and release button sticks when dirt and water enter the space between the shifter knob and release button.

COMMENTS:
Approval of a SMART Initiative has resulted in the development of procedures for fabrication of a protective cover for the transmission shift lever. The protective cover prevents dirt, water, or other contaminants from entering the space between the shift knob and release button.

MATERIALS/PARTS:

NSN
6115-01-364-8553
5975-01-077-2222

NOMENCLATURE
Glove, Patient Exam
Strap, Tie Down

PROCEDURES:

- (1) Clean and inspect transmission shift lever in accordance with TM9-2320-280-20-2.
- (2) Cut one finger at the palm from a glove.

WARNING

Ensure Parking Brake is applied. Use care when stretching glove finger over shifter knob not to engage the release button. Failure to do this may result in injury to personnel or damage to equipment.

4-4. Tact. Trucks cont.

- (3) Stretch and pull glove finger completely over shifter knob, making sure not to engage the release button.
- (4) Secure the glove finger to the shifter lever with a strap, tie down.

PUBLICATIONS AFFECTED:

TM9-2320-280-20

LEVEL OF MAINTENANCE:

Unit

4-4. Tactical Trucks

MODEL:

CUCV and HMMWV

SUBJECT:

Torque Converter Brace

POC:

Ms. Patricia Grashik, AMSTA-IM-MTA, DSN 786-7713,
Commercial (810) 574-7713 grashikp@cc.tacom.army.mil

DEFICIENCY:

The torque converter brace isn't referenced in the HMMWV and CUCV Special Packaging Instructions (SPI). The brace keeps the torque converter seated to the transmission during shipping. Without the brace, the torque converter can become unseated causing possible damage to the transmission front seal and oil pump.

COMMENTS:

A. The HMMWV and CUCV SPIs have been updated to include the requirement for the torque converter brace. In case the original brace from the manufacturer is not available, fabrication instructions for the brace were also added. The SPIs affected are:

<u>VEHICLE</u>	<u>SPI</u>	<u>PART NUMBER</u>	<u>NSN</u>
HMMWV	AK11612136 Rev H	(19207)12339146	2520-01-161-2136
CUCV	AK11465482 Rev E	(11862)8655111	2520-01-146-5482

B. The SPIs are available through the Packaging Data Master File (PMDf) at:

Director AMCPSCC
Attn: AMXLS-TM
111 Midway Roa
Tobyhanna, PA 18466-5097

4-4. Tact. Trucks cont.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Direct and General Support

Automatic Transmissions ...

Dexron III on the Job

Dexron III is the new fluid for automatic transmissions.

It's an improvement over Dexron II, and replaces it in all applications. Don't use Dexron II in any vehicle that calls for Dexron III. It may not hold up and could lead to equipment failure.

Dexron III is available in 1-qt plastic bottles with NSN 91 50-00-698-2382 and 55-gal drums with NSN 9150-01-114-9968.

PS 524

19

JUL 96

Chapter 08
**TRANSFER AND
FINAL DRIVE
ASSEMBLY**

Functional
Group Code
0801

3-12. Tactical Trucks

MODEL:

All M998 Series HMMWVs with 12340073 Transfer Case Assembly Installed

SUBJECT:

Transfer Case Vent Line Design Improvement

POC:

Ms. Jody McInerney, AMSTA-IM-MTA, DSN 786-7346,
Commercial (810) 574-7346 mcinernj@cc.tacom.army.mil

DEFICIENCY:

Reports from the field indicate that the vent line on transfer case assembly 12340073 can suck fluid into the air cleaner. This can occur when outside temperature is 80° F (26.6° C) or higher, speed is 60 mph (96 kph) or faster, and vehicle is driven for long durations.

COMMENTS:

Procedures have been developed to replace an existing vent line and add an additional vent line. This corrective action can be accomplished in the field by using the following parts and materials:

MATERIALS/PARTS

<u>NSNIPN</u>	<u>CAGEC</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
1064X6X6X4	79470	Tee	1
4730-01-211-0896		Elbow	3
4730-01-058-0900		Elbow	1
4730-00-278-3721		Nipple, Pipe	1
4730-01-175-6362		Elbow	1
5340-00-954-6014		Loop Clamp	1
4720-01-014-4915		Hose	100.4" Required
5340-00-057-3037		Loop Clamp	1
5975-00-074-2072		Tiedown Strap	3
5340-00-725-5280		Loop Clamp	1
5975-00-570-9598		Tiedown Strap	1
4730-01-070-7680		Elbow	1
1015-01-255-4144		Sealant	A/R
5305-01-393-6311		Screw	1

3.12. Tact. Trucks cont.

PROCEDURES:**REMOVAL AND INSTALLATION OF VENT HOSES:**

1. Disconnect battery ground cable. (Refer to TM9-2320-280-20).
2. Remove rear drive shaft. (Refer to TM9-2320-280-20).

NOTE

All material removed and not reused during installation will be returned to stock for disposition in accordance with AR 725-50.

3. Disconnect vent line (1) from elbow (10) on transfer case (2). (see figure 3-12)
4. Remove elbow (10) from transfer case (2).
5. Remove screw (4) and loop clamp (3) from bracket (5).
6. Remove screw (9) and loop clamp (7) from transmission governor cover (6).
7. Remove tee (8) from vent line (1) and discard vent line (1).
8. Remove tee (3) from two vent lines (2). (see figure 3-13)
9. Install two vent lines (2) on NSN 4730-01-058-0900 elbow (1).
10. Install NSN 4730-00-249-9721 pipe nipple (1) and NSN 4730-01-175-6362 elbow (2) on transfer case (3). (see figure 3-14)
11. Cut a piece of NSN 4720-01-014-4915 hose (4) 23.90- inches long, and connect to elbow (2) on transfer case (3).
12. Install hose (4) on transfer case bracket (7) with NSN 5340-00-954-6014 loop clamp (5) and NSN 5305-01-393-6311 screw (6). Tighten screw (6) to 15 lb-ft (20 N!m).
13. Install hose (4) on transmission governor cover (8) with NSN 5340-00-057-3037 loop clamp (9) and existing screw (10). Tighten screw (10) to 15 lb-ft (20 Nom).
14. Connect hose (4) to NSN 4730-01-211-0896 elbow (11).
15. Cut a piece of NSN 4720-01-014-4915 hose (12) 1 1-inches long, and connect to elbow (11).
16. Connect hose (2) to NSN 4730-01-211-0896 elbow (3). (see figure 3-15)
17. Using two NSN 5975-00-074-2072 tiedown straps (1), secure hose (2) to hose (5).
18. Cut a piece of NSN 4720-01-014-4915 hose (4) 39.25-inches long, and connect to elbow (3)..
19. Remove screw (1) from bracket (2) on frame rail (3), reposition bracket (2), and install on frame rail (3) with existing screw (1) and hole. (see figure 3-16)
20. Remove screw (4) and loop clamp (5) from bracket (2).
21. Route existing hose (6) and vent line hose (7) through NSN 5340-00-725-5280 loop clamp (5), and secure to bracket (2) with existing screw (4).

3-12. Tact. Trucks cont.

22. Remove screw (1) from bracket (2) on frame rail (3), reposition bracket (2), and install on frame rail (3) with existing screw (1) and hole. (see figure 3-16)
23. Connect hose (5) to NSN 4730-01-211-0896 elbow (3). (see figure 3-17)
24. Using NSN 5975-00-074-2072 tiedown strap (2), secure hose (4) to hose (5).
25. Remove hose (1) from elbow (3) on air cleaner (2). (see figure 3-18)
26. Remove elbow (1) from air cleaner (2). (see figure 3-19)
27. Cut 9.75-inches off of vent line (1). (see figure 3-18)
28. Cut two pieces of NSN 4720-01-014-4915 hose 10.50 and 15.75-inches long.
29. Connect the 15.75-inch piece of hose (1) to elbow (3). (see figure 3-17)
30. Connect hoses (5) and (6) to 1064X6X6X4 tee (4). (see figure 3-19)
31. Connect the 10.50-inch piece of hose (3) to tee (4).
32. Install NSN 4730-01-070-7680 elbow (1) in air cleaner (2).
33. Connect hose (3) to elbow (1) on air cleaner (2).
34. Using NSN 5340-01-205-5379 tiedown strap (8), secure hoses (5) and (6) to surge tank hose (7).
35. Install rear drive shaft. (Refer to TM9-2320-280-20).
36. Install battery ground cable. (Refer to TM9-2320-280-20).

PUBLICATIONS AFFECTED:

TM9-2320-280-20

TM9-2320-280-20P

LEVEL OF MAINTENANCE:

Unit

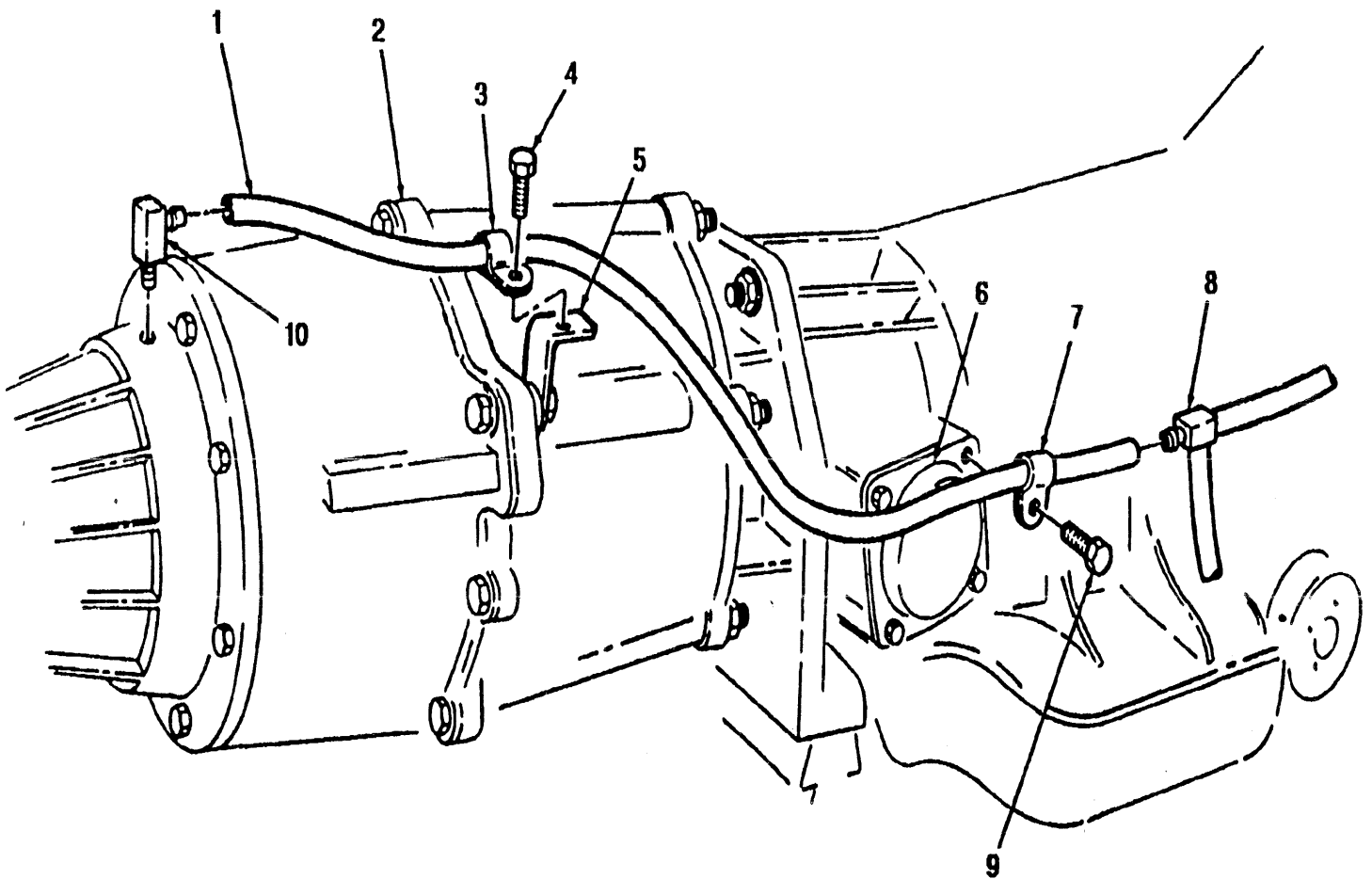


FIGURE 3-12

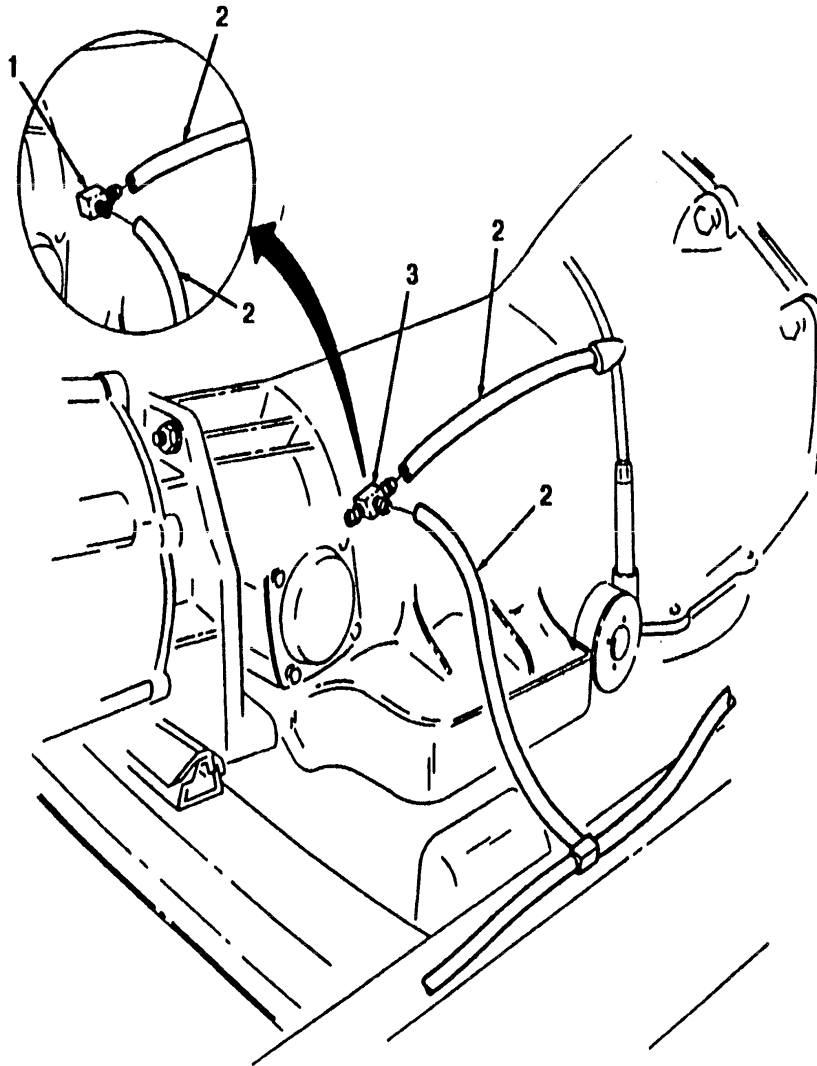


FIGURE 3-13

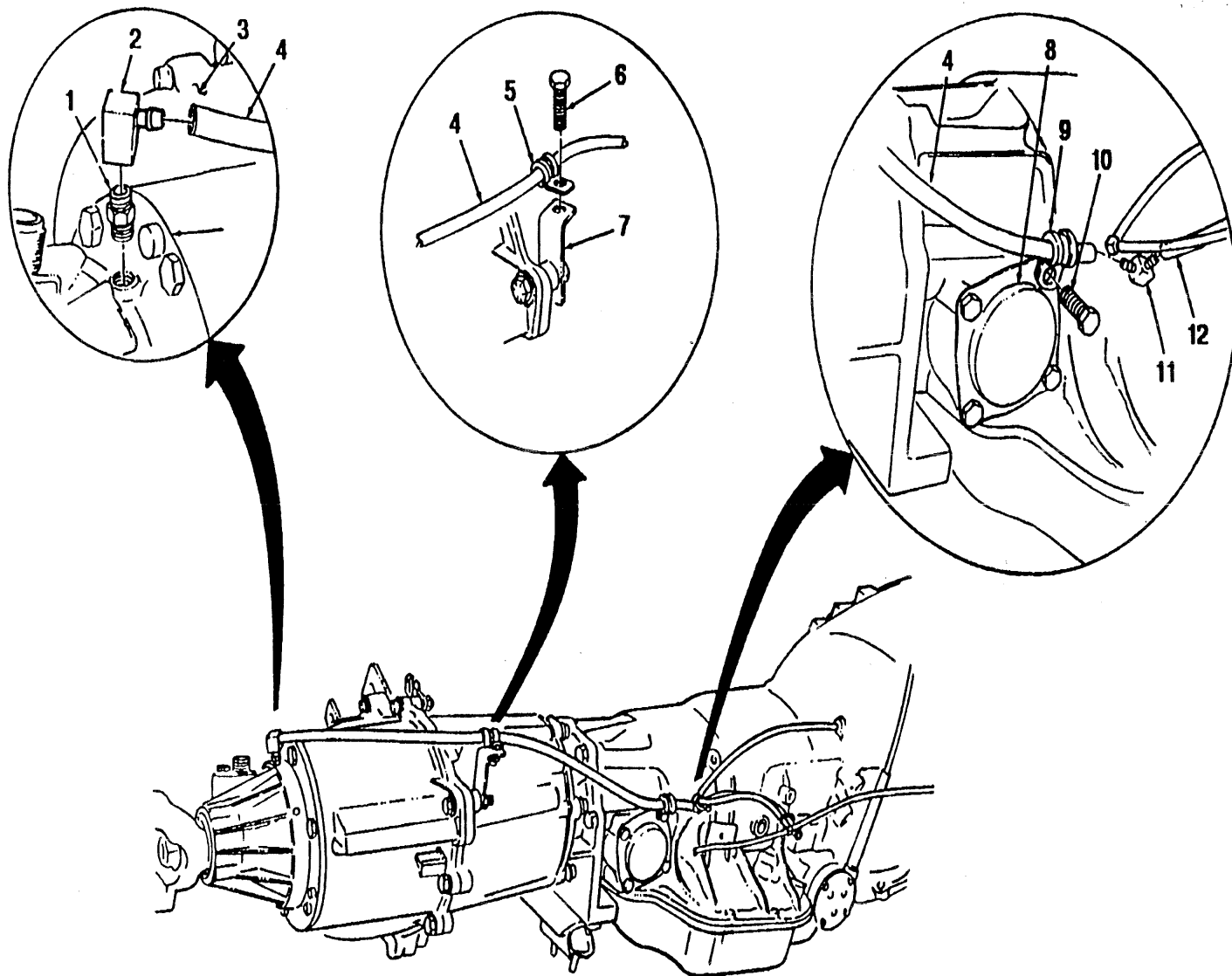


FIGURE 3-14

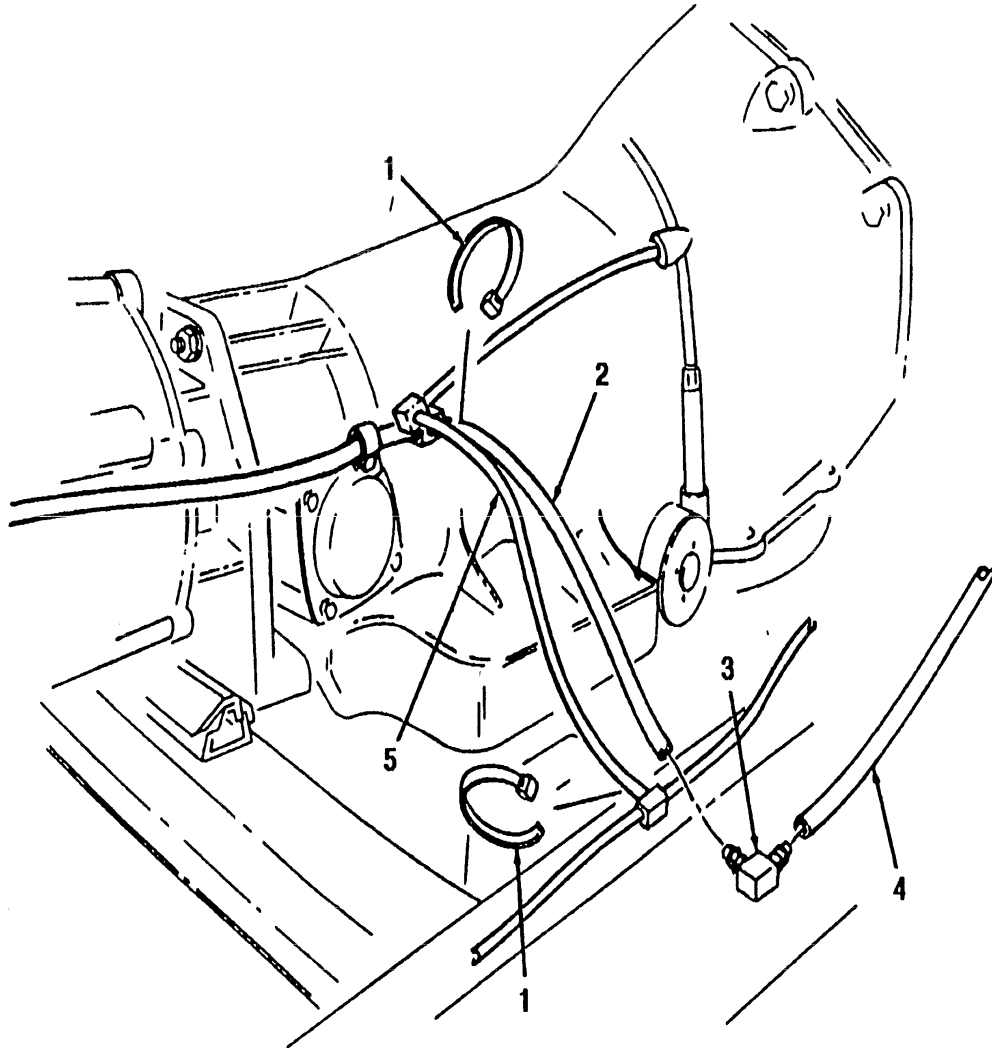


FIGURE 3-15

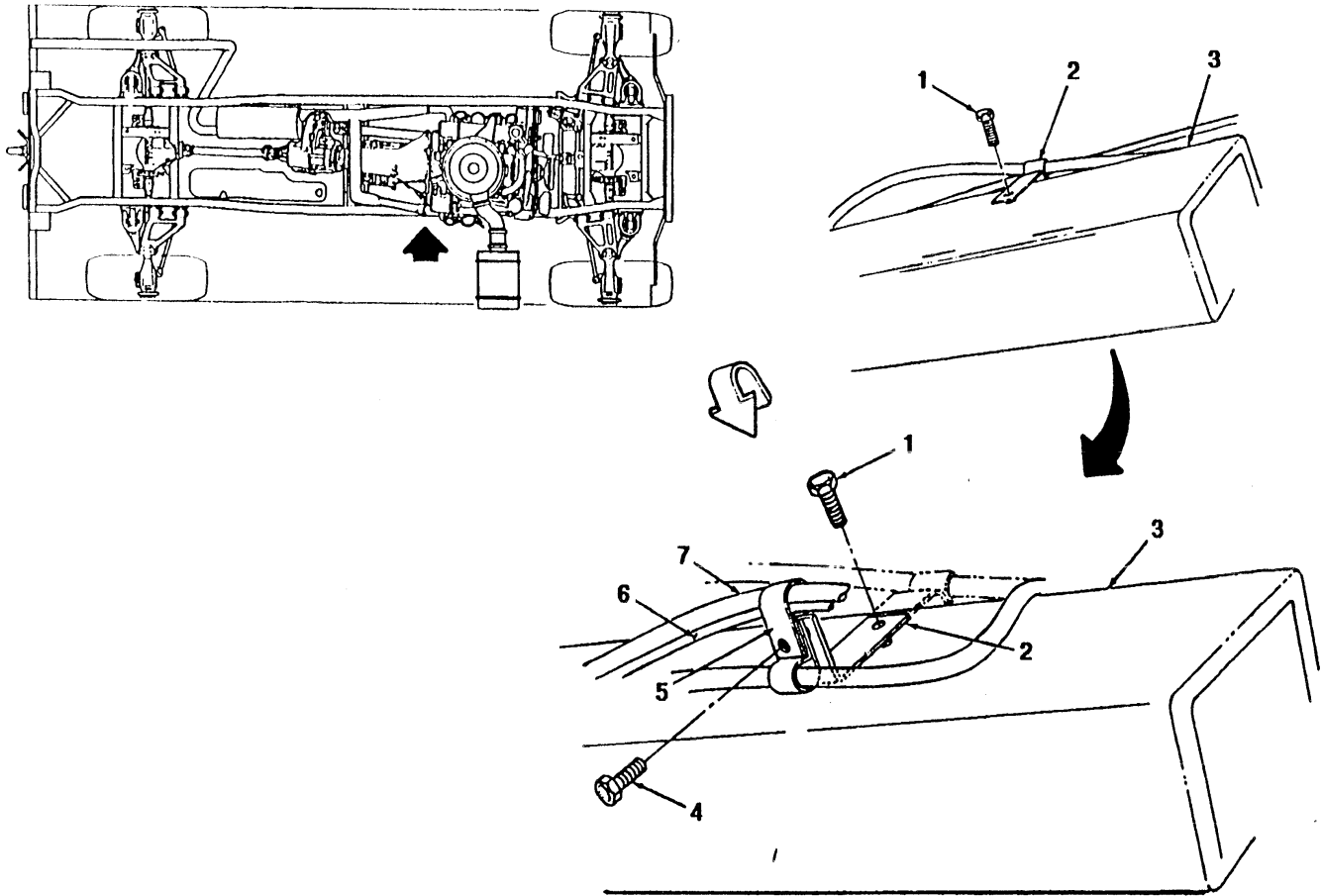


FIGURE 3-16

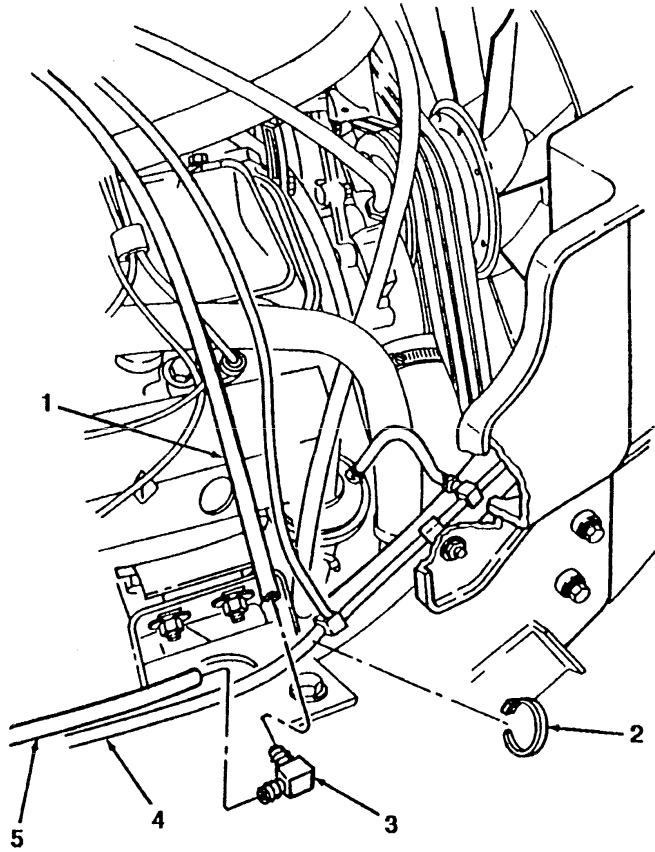


FIGURE 3-17

NOTE:

ALL DIMENSIONS ARE IN INCHES.

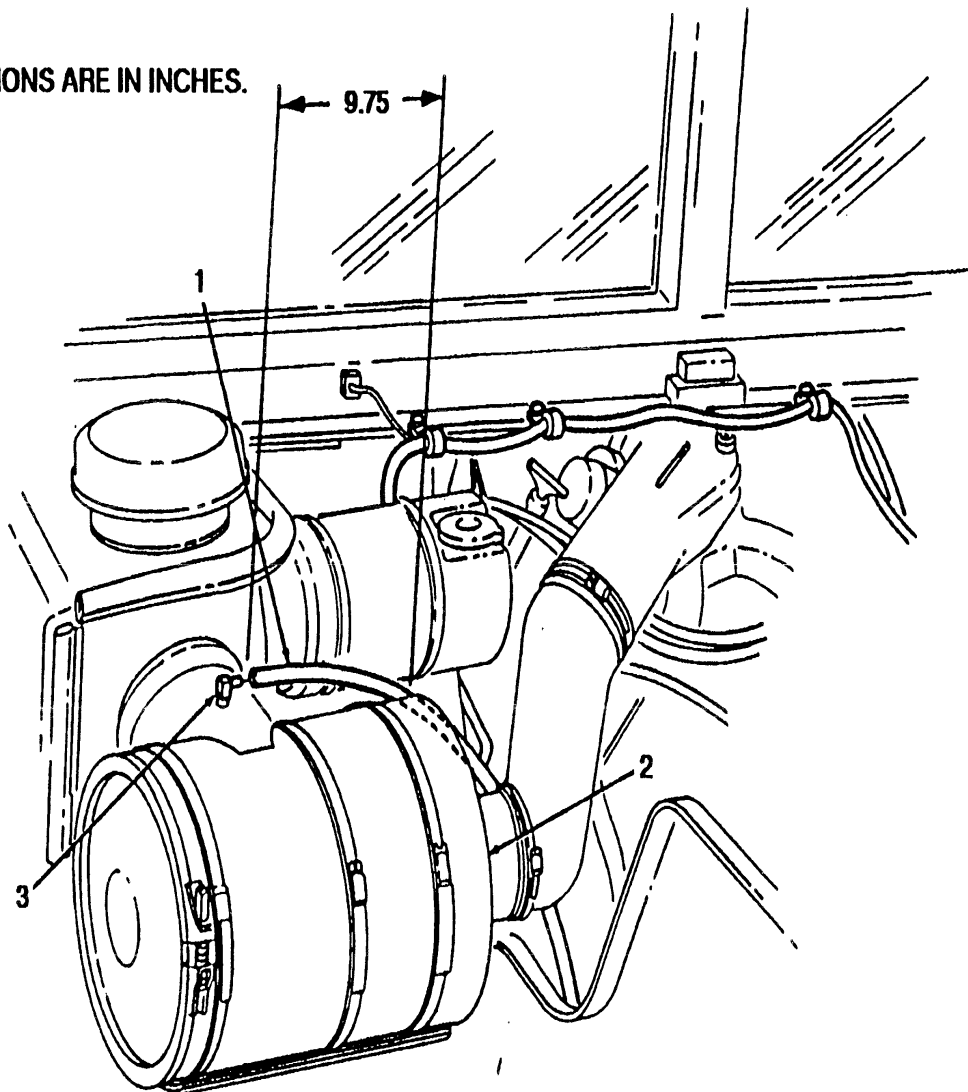


FIGURE 3-18

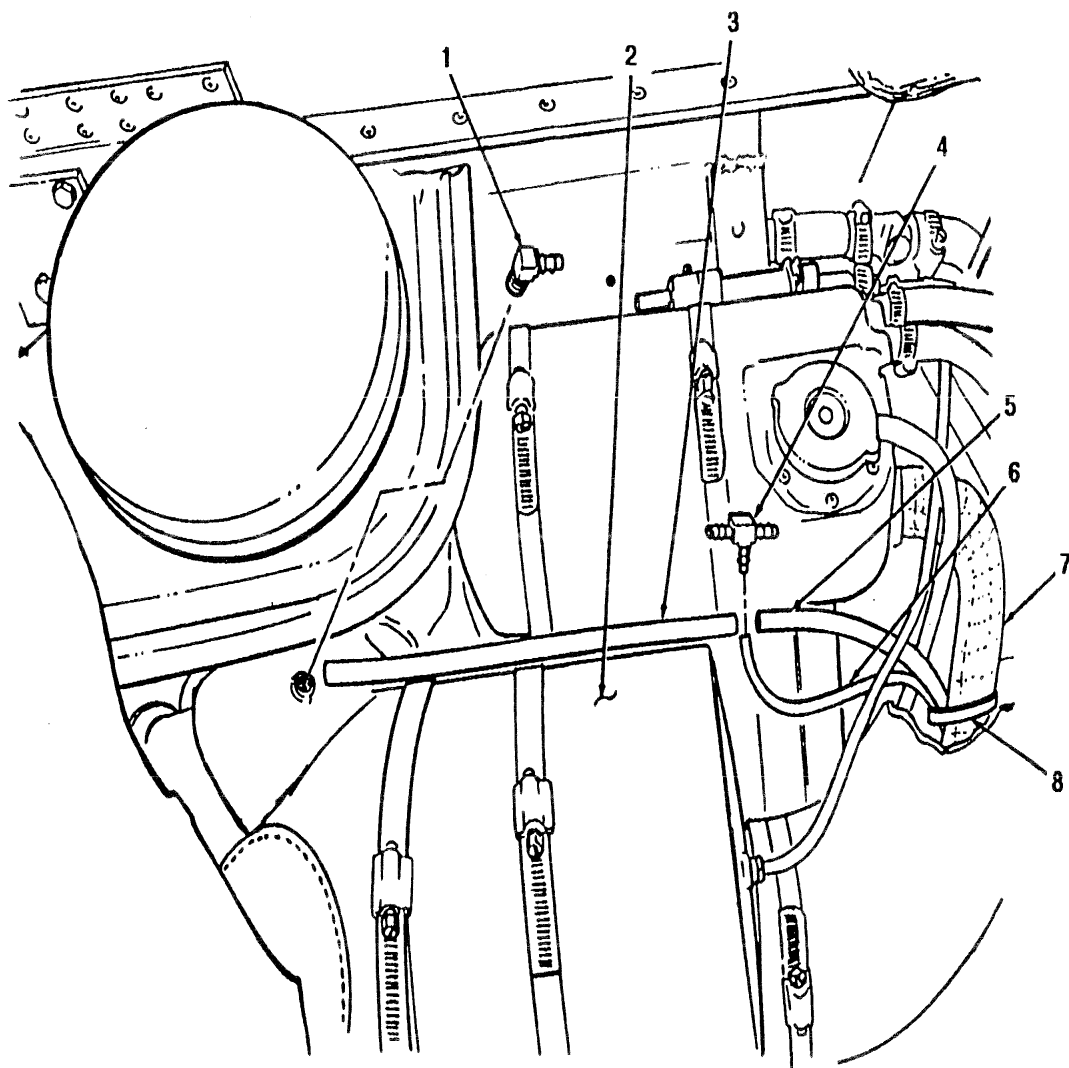


FIGURE 3-19

Make No Transfer

A HMMWV transmission that's too full of fluid could be your tipoff to a transfer case that's going dry. Either can lead to big trouble.

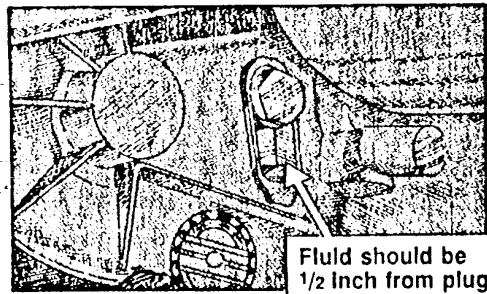
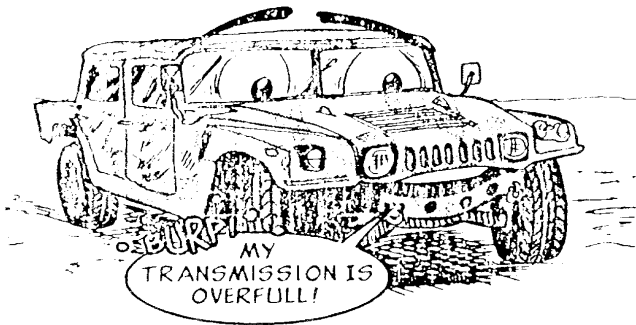
If the transmission shows overfull during PMCS, and you haven't added any fluid, get your mechanic to eyeball the transfer case fluid level.

Of course, make sure the HMMWV is running at operating temperature before you make your transmission check.

The level in the transfer case should be within 1/2 inch of the fill plug when the vehicle is level. If it's not, the HMMWV will have to go to support.

Chances are the transfer case fluid is going into the transmission.

Too much fluid in the transmission blows seals. Too little fluid in the transfer case will burn up the transfer. Either one leaves you on foot.



HMMWV ... 6601

Transfer Case Leaks



Operators, if you notice leaks at the transfer case cooler lines, fight the urge to put a wrench on the nut to stop the leak. Report the leak instead.

Too much tightening can damage the cooler inside.

Mechanics, when you see a leak, use torque — not muscle — to tighten the retaining nuts.

Use torque wrench, NSN 5120-00-640-6364, from your Common shop sets. The nuts get 16–18 lb-ft of torque. If you have an inch-pound wrench available, use 196 to 216 lb-in.

Torque retaining nuts to 16–18 lb-ft



Chapter 09

PROPELLER SHAFTS

Functional
Group Code
0900

4-5. Tactical Trucks

MODEL:

HMMWV, M998 Series

SUBJECT:

Propeller Shaft Wear on Fuel Tanks

POC:

Ms. Patricia Grashik, AMSTA-IM-MTA, DSN 786-7713,
Commercial (810) 574-7713 grashikp@cc.tacom.army.mil

DEFICIENCY:

In rough terrain, there is potential for the fuel tank to expand and drop on the propeller shaft if the fuel tank straps or body mounts are loose and the fuel vent line filter is plugged.

COMMENTS:

A. If you notice evidence of propeller shaft rub marks on the fuel tank, replace the fuel vent line filter, NSN 2910-01-210-5872. Use the procedures in TM9-2320-280-20-2 (Jan 90) w/C4, paragraph 3-26, page 3-48. Also, check the locknuts securing the fuel tank straps and body mounts for looseness. Proper torque for the strap locknuts is 23-27 lb-in (3-5 N•m). The body mount locknuts torque should be 90 lb-ft (122 N•m).

B. A semiannual PMCS check for fuel tank leaks, damage, mounting, proper torque of the locknuts securing the straps, and security of body mounts will be added in a future change to TM9-2320-280-20-1, Table 2-1.

PUBLICATIONS AFFECTED:

TM9-2320-280-20-1

LEVEL OF MAINTENANCE:

Unit

Chapter 1 0

FRONT AXLE

Functional
Group Code
1000-1004

4-8. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Use of Perma-Quick Pliers to secure the boot on the halfshaft with the small (33.7 mm) clamp.

POC:

Mr. Eddie Bynum, AMSTA-IM-MTA, DSN 786-8288,
Commercial (810) 574-8288 bynume@cc.tacom.army.mil

DEFICIENCY:

Information received from the field indicates that during halfshaft boot installation, some mechanics are damaging the small (33.7 mm) clamp used to secure the boot to the halfshaft.

COMMENTS:

A. We reviewed and approved a DA Form 2028 to use Perma-Quick Pliers, part number (08292) 424, NSN 5120-01-368-4179, as an alternative to side cutting pliers. The side cutting pliers should allow mechanics to secure the boot on the halfshaft without damage to the small clamp. However, they are configured with two blades and could damage the clamp when mechanics crimp the clamp together.

4-8. Tact. Trucks cont.

B. Since all users do not encounter this problem, use of Perma-Quick pliers is not mandatory but at the commanders discretion.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit

4-6. Tactical Trucks

MODEL:
HMMWV

SUBJECT:
Part Number for the Front Axle Differential

POC:
Ms. Patricia Grashik, AMSTA-IM-MTA, DSN 786-7713, Commercial (810) 574-7713 grashikp@cc.tacom.army.mil

DEFICIENCY:
The part number listed for the differentials, (19207) 12338415-3, in TM9-2320-280-34P (Aug. 91) doesn't have an NSN assigned and is not available through the supply system.

COMMENTS:
A. We updated the differential part number to (19207) 12338415-3 from (19207) 12338415-2. The updated part number doesn't include the flange as part of the assembly. This way the existing flanges can be reinstalled when replacing the differential. Also, the seals and locknuts come overpacked instead of installed on the assembly.

B. We're working on NSN assignment for part number (19207) 12338415-3. Until the overpacked configuration (less flanges) is available through the supply system, continue to use (19207) 12338414-2, NSN 2520-01-291-2975. We will publish another article once the NSN is assigned.

PUBLICATIONS AFFECTED:
TM9-2320-280-34P

LEVEL OF MAINTENANCE:
Direct Support

4-7. Tactical Trucks

MODEL:
HMMWV

SUBJECT:
Differential Installation

POC:
Mr. Keith J. Barthlow, AMSTA-IM-MTA, DSN 786-8288, Commercial (810) 574-8288 barthlok@cc.tacom.army.mil

DEFICIENCY:

Loose differential mounting bolts can cause enlargement of the mounting holes in the aluminum housing. The differentials may be getting damaged because of improper use of sealing compound during installation of replacement differentials.

COMMENTS:

A. Be sure to follow the instructions in TM9-2320-280-34 (Aug 91), paragraph 9-4, when installing a replacement differential. Step 9 says to apply sealing compound to the differential tapped holes.

B. When you- apply thread sealing compound to assemblies with blind holes (non-through holes), put a liberal amount into the bottom of the hole. As you install the fastener, the thread sealing compound is pneumatically forced onto the threads. To allow adequate coating of the threads, you should assemble the parts soon after applying the sealing compound.

4-7. Tact. Trucks cont. PUBLICATIONS AFFECTED:

TM9-2320-280-34

LEVEL OF MAINTENANCE:

Direct Support

3-12. Tactical Trucks**MODEL:**

All HMMWVs

SUBJECT:

Use of Pickle Fork for HMMVN Repairs

POC:

Ms. Kathy Miramonti, AMSTA-MTA, DSN 786-7151,
Commercial (313) 574-7151

COMMENTS:

A. Reports from the field indicate mechanics are damaging serviceable components, such as boots, by using a pickle fork instead of the recommended puller kit, NSN 5120-01-011-7938, during repair of the suspension and steering systems.

B. In the future, use the puller kit for the following procedures to avoid damage and save unnecessary replacement of the boots:

Geared Hub Replacement	TM9-2320-280-20-2, para 6-10
Center Link Replacement	TM9-2320-280-20-2, para 8-12
Tie Rod Maintenance	TM9-2320-280-20-2, para 8-13

PUBLICATIONS AFFECTED:

TM9-2320-280-20-2

LEVEL OF MAINTENANCE:

Unit

4-9. Tactical Trucks**MODEL:**

HMMWV

SUBJECT:

HMMWV Seals

POC:

Ms. Kathy Catenaro, AMSTA-IM-MTA, DSN 786-7151,
Commercial (810) 574-7151 catenark@cc.tacom.army.mil

DEFICIENCY:

Improper cleaning contributes to seal deterioration.

COMMENTS:

Everyone knows proper cleaning methods and authorized cleaning solutions are essential for the HMMWV. But did you know you will damage the seals on the HMMWV if you don't take the time to use some precaution in the seal areas when washing the vehicle after operation? For instance, if you clean with excessive water pressure in the geared hub area you can force dirt under and around the input seal. The dirt will deteriorate the seal and in turn ruin the costly hub assembly. Don't use harsh solvents either, because they too contribute to seal damage. So, to prolong life of both the seal and geared hub, always remember, take a little more time to clean the vehicle and don't direct high pressure water or harsh solvents in the seal area. Using the same precautions when washing other seal areas, can help prevent seals from being damaged on those components too.

PUBLICATIONS AFFECTED:

TM9-2320-280-10

LEVEL OF MAINTENANCE:

Operator

3-10. Tactical Trucks**MODEL:**

HMMWV

SUBJECT:

SUBJECT:

Tie Rod End Clamps

POC:

Ms. Kathy Catenaro, AMSTA-IM-MTA, DSN 786-7151, Commercial (810) 574-7151 catenark@cc.tacom.army.mil

DEFICIENCY:

Some tie rod end clamps are positioned incorrectly on the HMMWV. Mispositioning causes a slot to be worn in the clamp, which could damage the vehicle.

COMMENTS:

The illustrations in TM9-2320-280-20, para 8-7, Front Wheel Toe-In Alignment, 8-13, Tie Rod Maintenance, and 8-14, Tie Rod End Replacement will change to show the correct position of the outboard clamp. (see figure 3-3) The TM currently shows the clamp in the wrong position and may mislead mechanics to position the clamp in the wrong direction. Follow the CAUTION statement that says "Ensure bolt and nut on adjusting sleeve clamp nearest to the geared hub is facing half-shaft. Bolt and nut on adjusting sleeve clamp nearest to the frame must be facing away (180 °) from the stabilizing bar to prevent damage to equipment".

PUBLICATIONS AFFECTED

TM9-2320-280-20-2

LEVEL OF MAINTENANCE:

4-11. Tactical Trucks

MODEL:
HMMWV

SUBJECT:
Lubrication of Upper Ball Joints and Tie-Rod Ends

POC:
Mr. Ronald D. Hanebutt, AMSTA-IM-HLA, DSN 786-8837,
Commercial (810) 574-8837 hanebutr@cc.tacom.army.mil

DEFICIENCY:
Reports from the field indicate that excessive lubrication of the upper ball joints and tie-rod ends is rupturing the rubber protective boot.

COMMENTS:
A caution is being added to the next change/revision of TM9-2320-280-10, Appendix G to prevent future failures of the protective boots due to excessive lubrication. It will read as follows:

CAUTION

Do not over lubricate upper ball joints and tie-rod ends.
Excessive lubrication will result in the boot rupturing.
Observe the boot during lubrication: a seeping condition
indicates adequate lubrication, expansion of the boot
indicates over lubrication.

PUBLICATIONS AFFECTED:
TM9-2320-280-10

LEVEL OF MAINTENANCE:
Operator/Crew

UNCLASSIFIED

01 06 221818Z NOV 94 RRRR UUUU

AA ZYUW AMSTA-IM-MBP

NO

CDRTACOM WARREN MI //AMSTA-M//
SA PENTAGON WASHINGTON DC //SAAA//
CDRAMC ALEXANDRIA VA //AMCCG//
CDRINSCOM FT BELVOIR VA //IALOG//

CDRMTMC FALLS CHURCH VA //MTLO//

CDRUSACE WASHINGTON DC //CELD//
CDRUSAEIGHT SEOUL KOR //FKJ4//
CDRUSAHSC FT SAM HOUSTON TX //HSLO//

CDRUSARSO FT CLAYTON PM //SOCG//SOSF//

CDRUSARC FTMCPHERSON GA //AFRC//

CDRUSASOC FT BRAGG NC //AOLO//
CDRFORSCOM FTMCPHERSON GA //FCJ4//
CDRMDW WASHINGTON DC //ANLOG//
CDRTRADOC FT MONROE VA //ATPL//
CDRUSACIDC WASHINGTON DC //CILO//

CDRUSAISC FT HUACHUCA AZ //ASLO/ASOP-AC//

CDRUSARPAC FT SHAFTER HI //APLG//

CINCUSAREUR HEIDELBERG GE //AEAGD//

CNGB WASHINGTON DC //NGB-ARL-M/NGB-AVN-S//

CDRUSAMRDC FT DETRICK MD //SGRD-ZA//

AMSTA-CG/CD/CDD/CZ/CT/K/KA/KL/ML/MLP/B/BTF/F/FR/CL-NG/Q/I/U/MB/tIBP
(SOU M POC)/M-PS/SAIW-JME/DLA-ORW/CISAM-E-DE/SFAE-TWV-SPH/
AMSTA-TR-KT/-TR-QWL/IM-FTM

KEITH J. BARTHLOW/EQUIP SPEC(AUTO)
AMSTA-IM-MTA, 48288

'SIGNED'
CHARLES A. MUNSON/COL, GS/DIR-M

UNCLASSIFIED

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02 06 221818Z NOV 94 RRRR UUUU AA ZYUW AMSTA-IM-MBP NO

CDRUSASDC WASHINGTON DC //CSSD-ZA//

MV CAPE DECISION //MCMC//

MV CAPE DOUGLAS //MCMC//

MV CAPE HUDSON //MCMC//

MV CAPE HENRY //MCMC//

MV CAPE HORN //MVMC//

MV CAPE WRATH //MCHC//

MV CAPE WASHINGTON //MCMC//

MV 1ST LT JACK LUMMUS //COR//

CDRDISC PHILADELPHIA PA//DISC-O/OCA

DLA CAMERON STATION ALEXANDRIA VA//MM/MMSRS

MV PVT FRANKLIN J PHILLIPS //COR//

INFO DA WASHINGTON DC

//SARD-ZT/SARD-ZCS/SARD-ZP/SARD-ZR/SARD-ZS/SARD-SA/SARD

-SC/SARD-SM/DAAE-ZB/DAAE-LO/DAAR-OT/DACS-SF/DAIG-SD/DAL O-AOC/DALO-SML/DALO-

SMM/DAMO-DR/DAMO-FDV/DAMO-TRF/SGPS-PSP//

NAVSAFECEN NORFOLK VA //CHIEF OF STAFF//

HQ PABAF HICKAM AFB HI //LGTV//

WR-ALC ROBINS AFB GA //LVRDV//

AMSTA-CG/CD/CDD/CZ/CT/K/KA/KL/iL/IILP/B/BTF/F/FR/CL-NG/Q/I/U/MB/MBP
(SOU M POC)/M-PS/SAIW-JME/DLA-ORW/CISAM-E-DE/SFAE-TWV-SPH/
AMSTA-TR-KT/-TR-QWL/IM-FTM

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NO

AFLC WRIGHT PATTERSON AFB OH //IGFG//

AFSA KIRTLAND AFB NM //SEG//

CDRLOGSA REDSTONE ARSENAL AL //AMXLS-PS//

CDRUSASC FT RUCKER AL //CSSC-S/CSSC-M//

CDR 200TH TAHHC KAISERSLAUTERN //AERLO-MMC//

AIG 12269

AIG 9004

AIG 12285

UNCLAS

SUBJECT: GROUND PRECAUTIONARY MESSAGE (GPM), TACOM CONTROL NO.95-02.

"MAINTENANCE ADVISORY" FOR GEARED HUB (NSN 2530-01-203-5746 AND

2530-01-203-5745), USED ON THE HIGH MOBILITY MULTI-PURPOSE WHEELED

VEHICLE (HMMWV), M998 T61494, M1038 T61562, M966 T05096, M1097

679, M1025 T92242. M1026 T92310, H1037 T07543, M996 T38707, M997

T38844, M1035, M1042, M1043, M1044, M1045. M1046.

"ATTENTION"
THIS MESSAGE CONTAINS INFORMATION THAT IS VITAL TO THE
SAFETY OF ARMY PERSONNEL AND THE OPERATION OR
MAINTENANCE OF ARMY EQUIPMENT.

AMSTA-CG/CD/CDD/CZ/CT/K/KA/KL/ML/MLP/B/BTF/F/FR/CL-NG/Q/I/U/MB/MBP
(SOU M POC)/M-PS/SAIW-JME/DLA-ORW/CISAM-E-DE/SFAE-TWV-SPH/
AMSTA-TR-KT/-TR-QWL/IM-FTM

KEITH J. BARTHLOW/EQUIP SPEC(AUTO)

AMSTA-IM-MTA, 48288

CHARLES A. MUNSON/COL. GS/DIR-M

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XX

A. MESSAGE, TACOM, AMSTA-M. 081415Z JUN 92, TACOM SAFETY-OF-USE MESSAGE, CONTROL NUMBER 92-10, "LIMITED ONE TIME INSPECTION". OF THE SPINDLE NUT LOCKWASHER (NSN 5310-01-213-4185) ON M998 SERIES HIGH MOBILITY MULTIPURPOSE WHEELED VEHICLE (HMMWV) AND GEARED HUB ASSEMBLIES IN STOCK (NSN 2530-01-203-5746 AND 2530-01-203-5745).

B. MESSAGE, TACOM, AMSTA-M, 151300Z JUN 90, TACOM SAFETY-OF-USE MESSAGE. CONTROL NO. 90-23, ADVISORY TECHNICAL/MAINTENANCE, HIGH MOBILITY MULTIPURPOSE WHEELED VEHICLE (HMMWV). SPINDLE LOCKNUT, NSN 5310-01-213-4185.

C. MESSAGE, TACOM, AMSTA-MTA, 121345Z JAN 87. SAFETY-OF-USE-MESSAGE, CONTROL NUMBER 87-1. ONE-TIME INSPECTION. M998 SERIES HIGH MOBILITY MULTIPURPOSE WHEELED VEHICLE (HMMWV) SPINDLE NUT LOCKWASHER.

1. DISTRIBUTION: THIS IS A "GROUND PRECAUTIONARY MESSAGE." MACOM COMMANDERS WILL RETRANSMIT THIS MESSAGE TO ALL SUBORDINATE COMMANDS/ACTIVITIES WITHIN 24 HOURS OF RECEIPT OF THIS MESSAGE AND ACKNOWLEDGE RECEIPT OF THIS MESSAGE WITHIN FIVE WORKING DAYS TO: CDRTACOM, WARREN MI //AMSTA-IM-MBP// DSN 786-6096/7393; COMMERCIAL(810) 574-6096/7393 OR DDN ADDRESS: SOUM-GPM@CC.TACOM.ARMY.MIL

2. PROBLEM: TACOM CONTINUES TO RECEIVE REPORTS THAT THE SPINDLE

AMSTA-CG/CD/CDD/CZ/CT/K/KA/KL/ML/MLP/B/BTF/F/FR/CL-NG/Q/I/U/MB/MBP
(SOUM POC)/M-PS/SAIW-JME/DLA-ORW/CISAM-E-DE/SFAE-TVIV-SPH/
AMSTA-TR-KT/-TR-QWL/IM-FTM

KEITH J. BARTHLOW/EQUIP SPEC(AUTO)
AMSTA-IM-MTA, 48288

CHARLES A. MUNSON/COL. GS/DIR-M

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NO

A LOCKNUT WITHIN THE GEARED HUB ASSEMBLY LOOSENS. THE PROBLEM IS ATTRIBUTED TO THE LOCKWASHER TAB NOT BEING PROPERLY BENT INTO THE LOCKNUT AND REUSE OF THE LOCKWASHER. WHEN THIS LOCKNUT LOOSENS. THE WHEEL AND TIRE ASSEMBLY CAN SEPARATE FROM THE VEHICLE CAUSING LOSS OF VEHICLE CONTROL.

3. USER ACTIONS: A. IT IS ESSENTIAL THAT USERS REPLACE THE SPINDLE NUT LOCKWASHER (NSN 5310-01-213-4185, TM 9-2320-280-20P C2. AUG 91, FIGURES 103 AND 109, ITEM 20, 4 EACH REQUIRED) DURING THE SEMI-ANNUAL SCHEDULED MAINTENANCE (TM 9-2320-280-20-1 C4. JAN 90, PMCS TABLE 2-1. ITEM 16C). THE SPINDLE NUT LOCKWASHER IS A MANDATORY REPLACEMENT ITEM; DO NOT REUSE THE LOCKWASHER.

B. REVIEW OF DEMAND DATA FOR THE SPINDLE NUT LOCKWASHER REVEALS A SIGNIFICANTLY LOW DEMAND WHICH IS NOT CONSISTENT WITH THE SCHEDULED SERVICE REPLACEMENT. THIS SUGGESTS THAT THE LOCKWASHER IS BEING REUSED OR THE SERVICE IS NOT BEING PERFORMED.

C. ORGANIZATIONAL MAINTENANCE IS REQUIRED TO PERFORM THIS SCHEDULED SEMI-ANNUAL SERVICE IAW TM 9-2320-280-20-2 C4, JAN 90, PARA 6-13. COMPLIANCE WITH THIS SCHEDULED SERVICE WILL PREVENT WHEEL SEPARATIONS.

D. UNIT COMMANDERS, CONTACT YOUR LOCAL TACOM LOGISTICS ASSISTANCE
AMSTA-CG/CD/CDD/CZ/CT/K/KA/KL/ML/MLP/B/BTF/F/FR/CL-NG/Q/I/U/MB/MBP
(SOUM POC)/M-PS/SAIW-JME/DLA-ORW/CISAM-E-DE/SFAE-TWV-SPH/
AMSTA-TR-KT/-TR-QWL/IH-FTM

KEITH J. BARTHLOW/EQUIP SPEC(AUTO)
AMSTA-IM-MTA, 48288

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221818ZNOV94

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NO

REPRESENTATIVE (LAR) OR YOUR STATE SURFACE MAINTENANCE MANAGER UPON RECEIPT OF THIS MESSAGE FOR ASSISTANCE. IF YOU DO NOT KNOW WHO YOUR TACOM LAR IS, FOR CONUS CALL DSN 367-6204/6293, FOR GERMANY CALL DSN 370-6128/7436 AND FOR KOREA CALL DSN 723-7519/3880. LARS ARE AVAILABLE TO HELP YOU.

4. TACOM/PM ACTION:

A. HMMWV'S WITH SERIAL NUMBER 136,895 AND ABOVE USE A NEW, 8 SLOT LOCKNUT DESIGN. THIS DESIGN ALLOWS TWO OF THE LOCKWASHER TABS TO BE BENT INTO THE LOCKNUT. TACOM WILL ISSUE MODIFICATION KITS TO INSTALL THE NEW LOCKNUT TO ALL USERS WITH VEHICLES UNDER SERIAL NUMBER 136,895. FURTHER INFORMATION WILL BE ISSUED ONCE KIT AVAILABILITY IS DETERMINED.

B. THE INFORMATION PROVIDED IN THIS MESSAGE WILL BE PUBLISHED IN AN EIR DIGEST ARTICLE AND PS MAGAZINE NLT 2ND QTR FY95.

5. SUPPLY STATUS: DUE TO LOW DEMANDS, LOCKWASHERS ARE IN LIMITED SUPPLY. AS DEMANDS INCREASE. AVAILABILITY WILL IMPROVE.

6. POC'S: WITHIN THE DIRECTORATE FOR MAINTENANCE (NMP) IS MR. KEITH BARTHLOW, AMSTA-IM-MTA, DSN 786-8288; WITHIN THE PROJECT MANAGER'S OFFICE IS MR. DOUG PHILLIPS, SFAE-TWV-SPH, DSN 786-6710.

AMSTA-CG/CD/CDD/CZ/CT/K/KA/KL/ML/MLP/B/BTF/F/F R/CL-NG/Q/I/U/MB/MBP
(SOUM POC)/M-PS/SAIW-JME/DLA-ORW/CISAM-E-DE/SFAE-TWV-SPH/
AMSTA-TR-KT/-TR-QWL/111-FTM

KEITH J. BARTHLOW/EQUIP SPEC(AUTO)

AMSTA-IM-MTA, 48288

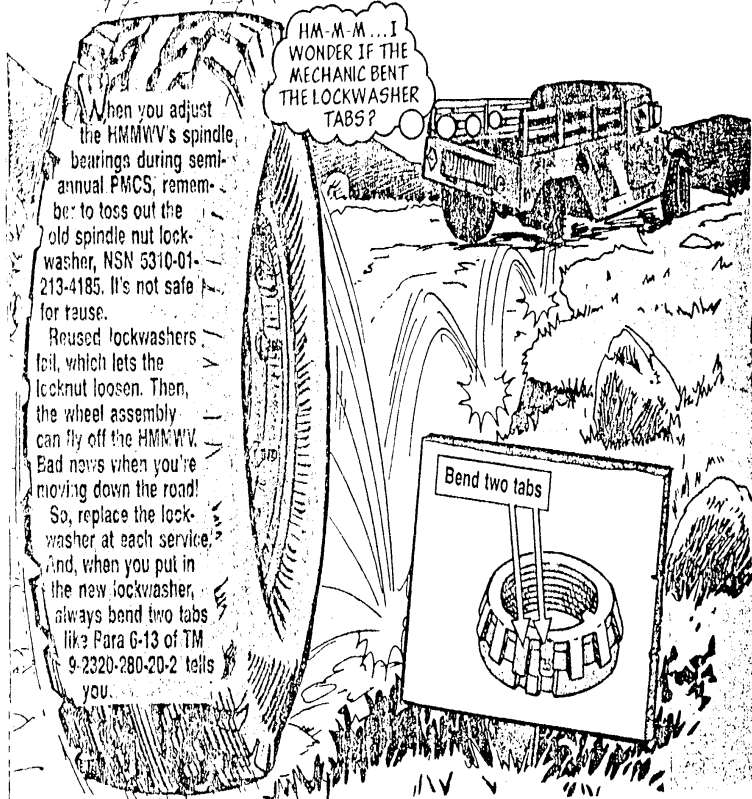
CHARLES A. MUNSON/COL. GS/DIR-M

UNCLASSIFIED

221818Z NOV94

HMMWV

Replace Spindle Lockwasher



When you adjust the HMMWV's spindle bearings during semi-annual PMCS, remember to toss out the old spindle nut lockwasher, NSN 5310-01-213-4185. It's not safe for reuse.

Reused lockwashers fail, which lets the locknut loosen. Then, the wheel assembly can fly off the HMMWV. Bad news when you're moving down the road! So, replace the lockwasher at each service. And, when you put in the new lockwasher, always bend two tabs like Para 6-13 of TM 9-2320-280-20-2 tells you.

One Time Lock Washer

Every time you replace a loose halfshaft bolt on your HMMWV, be sure you replace the lock washer, too.

The lock washer won't hold tight the second time around. And if you use them over, you never know which time is one too many.

So why take a chance? Replace the lock washer with NSN 5310-01-185-7218 and the bolt with NSN 5306-01-185-7048.

Also, change them when the brake disc rotor or halfshaft assembly is replaced.

PS 511

23

JUN 95

Jolted Halfshaft Bolt

1560

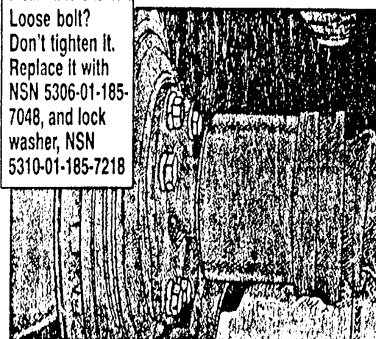
Vibration loosens the halfshaft bolts on Humvees. As they loosen, they back out closer and closer to the brake caliper adapter. Eventually—SNAP!—they break off.

Then the brake rotor wobbles. That wears out brake pads, leaving you brakeless.

So, eyeball the halfshaft bolts any time you pull a service on the HMMWV.

Look for shiny spots around the bolt. If you see a loose bolt, replace both the lock washer and the bolt.

Loose bolt? Don't tighten it. Replace it with NSN 5306-01-185-7048, and lock washer, NSN 5310-01-185-7218



PS 505

6

DEC 94

Clamp Goes Behind



Mechanics, your Humvee's

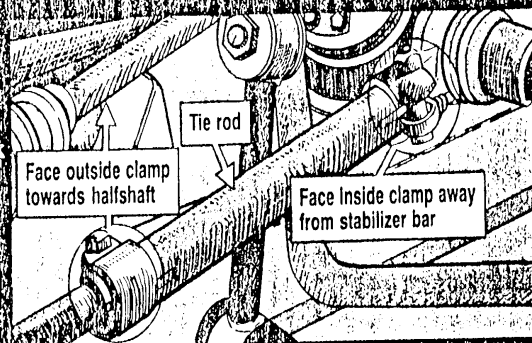
ride-in adjustment's not done until the tie rod clamps are pointed the right way.

The clamps can do a lot of damage if they're installed with bolts facing the wrong way.

On a hard turn, the outside clamp can dig into the wheel or tire, and the inside clamp can hit the stabilizer bar. All parts suffer.

Head off this damage by making the outside clamp face the halfshaft and the inside clamp face away from the stabilizer bar.

Likewise, when you have a HMMWV in for service, get under the truck and look at the tie rod end clamps. If they're in harm's way, change them.



PS 508

20

MAR 95

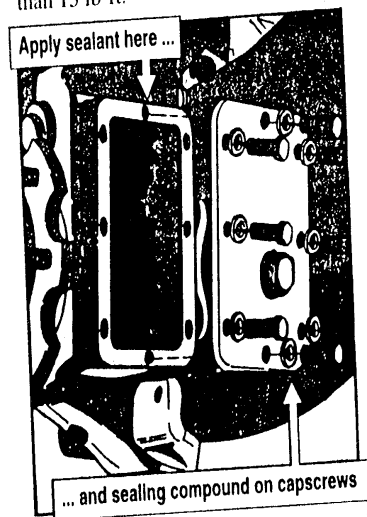
Sealing Geared Hubs

If you have trouble keeping oil in your HMMWV's geared hubs, maybe you need to change how you apply the cover seal.

The RTV method shown in TM 9-2330-280-20-2 works great for some folks. But the sealant starts to dry just as soon as you apply it. Put the cover on quickly. Then put sealing compound, NSN 8030-01-025-1692, on the capscrews and tighten them immediately to no more than 15 lb-ft torque.

If that method doesn't work for you, try this one:

Cut a piece of 1/16-in gasket paper, NSN 5330-00-270-8470, to fit the cover. You won't need any RTV under the cover, but you still need to put sealing compound on the cover capscrews and torque them to no more than 15 lb-ft.



PS 519

3

Chapter 11

REAR AXLE

Functional
Group Code
1100

Rear Halfshaft Bolt Help

Dear Half-Mast,

What is the best way to keep rear halfshaft bolts tight on our HMMWVs? We have put on new lock washers twice in the last three months, but the bolts still work loose.

SGT T.D.

NOT
AGAIN!

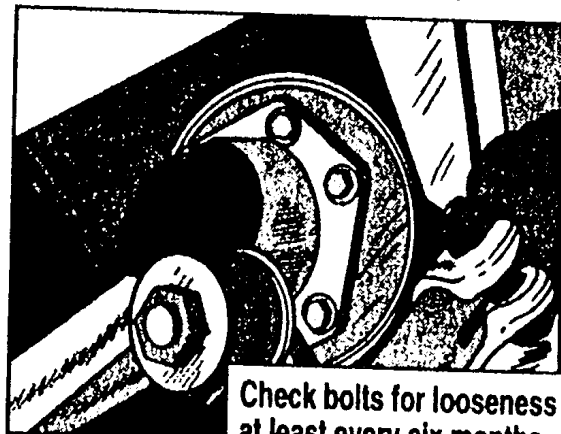
HEY!
WAIT FOR
ME!!

Dear Sergeant T.D.,

Eternal vigilance and sealing compound are your best bets. Use new lock washers, NSN 5310-01-185-7218, and sealing compound, NSN 8030-01-171-7628, every time you replace a halfshaft bolt.

The rest of the time keep an eye on those bolts. Check 'em for looseness at least every six months and more often if necessary. Use a torque wrench every time you check the bolts. Torque bolts to 48 lb-ft.

Half-Mast



Check bolts for looseness
at least every six months

WHEELED VEHICLES

Chapter 12

BRAKES

Functional
Group Code
1201-1204

3-13. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

MWO9-2320-280-35-1

POC:

Mr. Eric Sutman, AMSTA-MTA, DSN 786-7151,
Commercial (313) 574-7151

DEFICIENCY:

The HMMWV parking brake MWO is vague about the disposition of the brake calipers replaced by the MWO.

COMMENTS:

A. We're publishing this article in response to an approved SMART initiative. The SMART originator recommended that the calipers be inspected, repaired, and restocked.

B. The MWO says, "All parts not used during installation will be returned to stock for disposition in accordance with AR 725-50." This guidance can be unclear. The intent is to get the most economical use out of the used parts.

C. We agree with the SMART originator. Units should inspect, repair and restock the calipers so that they can be used locally. It wouldn't be cost effective to have a depot level repair program. The costs to transport, store, rebuild, and reissue the calipers would make a depot level repair program uneconomical. But, the calipers can be economically repaired and reissued locally.

D. If local units can't use the calipers, they should be turned in to the DRMO.

PUBLICATIONS AFFECTED:

MWO9-2320-280-35-1

LEVEL OF MAINTENANCE:

Direct Support

4-4. Tactical Trucks

MODEL:

M998 Series Vehicles

SUBJECT:

Rear Parking Brake Cable and Clamp

POC:

Ms. Patricia Grashik, AMSTA-IM-HIA, DSN 786-7566,
Commercial (810) 574-7566 grashikp@cc.tacom.army.mil

DEFICIENCY:

The rear parking brake cables are being crushed or chafed.

COMMENTS:

During your semi-annual PMCS, check the rear parking brake cables and clamps for damage. If any damage to the cable is detected, install the new design cable clamp bracket, NSN 5340-01-394-2408 (RH) or 5340-01-394-8496 (LH). Replace missing or damaged clamps.

PUBLICATIONS AFFECTED:

TM9-2320-280-20-1

LEVEL OF MAINTENANCE:

Unit

**3-30. Tactical Trucks
cont.**

PUBLICATIONS AFFECTED:

TM9-2320-280-34P

TM9-2320-280-20P

LEVEL OF MAINTENANCE:

Unit

3-31. Tactical Trucks

MODEL:

HMMWV M998 Series Vehicles (Serial Number 44825 and above) and M998 Series Vehicles with MWO 9-2320-280-35-1 (Park Brake Retrofit) applied.

SUBJECT:

Rear Parking Brake Cable/Bracket.

POC:

Ms. Jody McInerney, AMSTA-HLA, DSN 786-5481

DEFICIENCY:

The parking brake cables used on the combined service/park brake assembly are chafing. They are also being crushed by the lower control arm.

COMMENTS:

The deficiency is caused by the park brake cable bracket. A design change is being made to the bracket. The new bracket will allow use of the existing mounting holes and keep the cable from being crushed and chafed.

PROCEDURE:

Until the new brackets are available through the supply system, recommend the parking brake cables and clamps be checked during PMCS for damage and/or chaffing in the area of the control arm. (see figure 3-79) If detected, perform the following steps.

1. Remove clamp. Discard if damaged.
2. Remove any old tape that may exist.

3-31. Tactical Trucks cont.

3. Wrap approximately a six inch piece of rubberized tape (NSN 9320- 01-299-3332) or equivalent in a spiral motion around the cable in the area of the control arm. (see figure 3-79)
4. Install clamp.

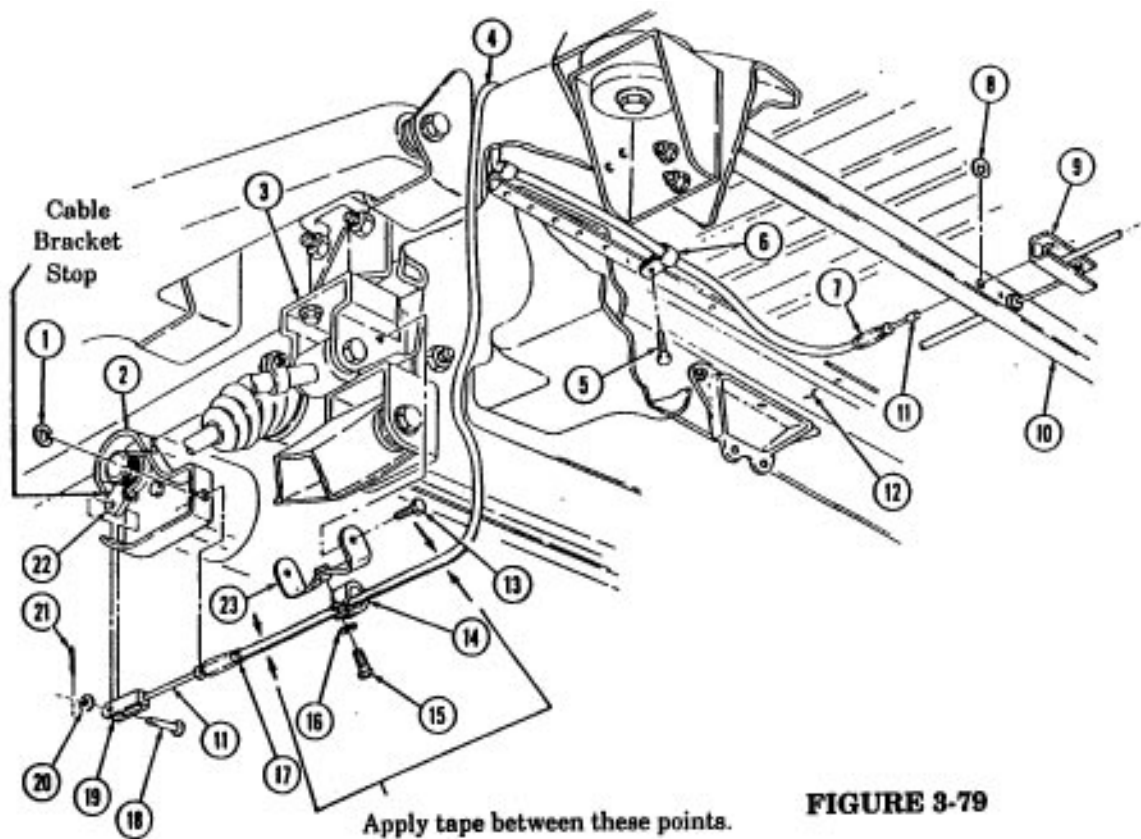
If during next PMCS, damage or chaffing is detected, repeat procedure.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit



4-5. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Brake Adapters

POC:

Ms. Patricia Grashik, AMSTA-MTA, DSN 786-7427,
Commercial (313) 574-7427

DEFICIENCY:

There is not enough clearance to remove the center screws on the differential cover. In order to remove the differential cover, the housing caliper and rotors need to be removed and the left hand disk brake adapter loosened.

COMMENTS:

A. We've redesigned the adapters by cutting away the overlap of material on the adapters where it's positioned near the differential cover screws. This provides clearance so the center differential cover screws can be removed. The part number for the new adapters, (22075) 10453002, NSN 2530-01-314-1129, is listed in TM9-2320-280-34P, Figure 115, Item 12, and Figure 116, Item 13. The new adapters were installed on production vehicles beginning Jan 90, with vehicle serial numbers 100,000 and above. Vehicles with serial numbers below 100,000 can have the adapters installed on an attrition basis by Direct Support.

B. Do not attempt to modify the original brake adapters. Cutting away any material could cause the brake adapter to fail.

C. The differential cover replacement procedures are in TM9-2320-280-20-2, Page 6-40.2, Para 6-18.1.

PUBLICATIONS AFFECTED:

TM9-2320-280-20-2

TM9-2320-280-34

TM9-2320-280-34P

LEVEL OF MAINTENANCE:

Unit and Direct Support

4-10. Tactical Trucks

MODEL:

All Heavy and AI Model HMMWV Vehicles (M966A1, M996A1, M997A1, M998A1, MIO25A1, MIO26A1, M1035A1, M1038A1, M1043A1, M1044A1, M1045A1, M1046A1, M1097A1, M1097)

SUBJECT:

Front Brake Shoes

POC:

Mr. Fred Steele, AMSTA-IM-MTA, DSN 786-7713, Commercial (810) 574-7713
steelef@cc.tacom.army.mil

EFICIENCY:

The current part number in TM9-2320-280-20P, Fig. 116, Item 12 lists the individual front shoe for the HVY (M1097) only.

COMMENTS:

The current part number 6000026 (NSN 2530-01-359-1457) is the individual shoe for the HMMWV A1 and Heavy applications. In the future, requisitions should be for -part number 57K0264 (NSN 2530-01-407-3977) which is the kit of 4 each for the above applications. This will be reflected in the new RPSTL TM9-2320-280-24P-1.

PUBLICATIONS AFFECTED:

TM9-2320-280-24P-1

LEVEL OF MAINTENANCE:

Unit

8-2. Vehicles with Brakes

MODEL:

All vehicles with brakes

SUBJECT:

Alternative method of minimizing exposure to asbestos during brake service/inspection (control number MTB 93-005)

POC:

Mr. Milt Parker, AMSTA-MTB, DSN 786-8277

COMMENTS:

A. The preferred method of minimizing exposure to asbestos is the High Efficiency Particulate Air (HEPA) vacuum. See Apr 90 issue of PS Magazine.

B. However, in the event the HEPA is not available or work is performed in a field environment, an additional alternative method can be utilized to reduce exposure to asbestos fibers. Use an ordinary spray bottle filled with a soap/water solution. Spray affected area and surrounding air space. Asbestos fibers will saturate out of the air and settle. Work must be performed in a timely manner as water will evaporate. Clean all soap from brake linings being reused.

C. Waste material must be captured in a suitable container, clearly marked, and disposed of IAW the installation's hazardous waste policy. If the service situation risks introducing airborne particles into the work area, the technician should use a respirator IAW AR 11-34. Personnel exposed to asbestos must comply with the local Commander's asbestos management program and TB MED 513.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

N/A

3-12. Tactical Trucks

MODEL:

All M998, M998A1, and M998A2 Series

SUBJECT:

Fabrication of Rear Brake Caliper Tool

POC:

Ms. Patricia Grashik, AMSTA-IM-MTA, DSN 786-7713,
Commercial (810) 574-7713 grashikp@cc.tacom.army.mil

DEFICIENCY:

Reports from the field indicate that personnel have had difficulty in rotating and resealing rear brake caliper pistons when replacing brake pads.

COMMENTS:

Procedures have been developed to fabricate two tools, either of which can aid in rotating and resealing the caliper piston. Tool one is a hex wrench that can be made at unit maintenance level. Tool two is an open end wrench that can be made at direct and/or general support maintenance levels. Use of these tools is not mandatory, but they can be fabricated and used at the commander's discretion.

MATERIALS/PARTS:

NSN	NOMENCLATURE	QT-Y
9515-00-254-6914	Strip, Metal	A/R
9515-00-204-3981	Strip, Metal	A/R

PROCEDURES:**A. FABRICATION OF TOOL ONE, HEX WRENCH**

Using NSN 9515-00-254-6914 strip metal, fabricate hex wrench as shown in figure 3-19.

B. FABRICATION OF TOOL TWO, OPEN END WRENCH

1. Using NSN 9515-00-254-6914 metal strip, 0.188 inch thick, fabricate handle (2) as shown in figure 3-20.
2. Using NSN 9515-00-204-3981 metal strip, 0.125 inch thick, fabricate two jaws (1).
3. Weld two jaws (1) to handle (2).

3-12. Tact. Trucks cont.

C. UTILIZATION OF HEX WRENCH OR OPEN END WRENCH TO ROTATE AND RESEAT CALIPER PISTON

CAUTION

Caliper must be supported during removal to prevent damage to brake lines. This can be accomplished by using NSN 5975-00-985-6630 tiedown strap or similar tiedown strap.

Applying force to piston cap will result in piston cap damage.

With caliper secured, use either hex wrench or open end wrench to rotate caliper piston in a clockwise direction, and at the same time, apply force on outer piston hex until caliper piston is seated in caliper bore.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit, Direct and General Support

Parking Brake Cable Pinch

HAVE YOU SEEN MY HUMVEE?

ONLY IN PASSING!

Bad bracket design may be causing wear and tear on your HMMWV's parking brake cable.

The cable problem has been spotted on HMMWVs with serial number 44825 and above, and on HMMWVs that have had MWO 9-2320-280-35-1 applied. The MWO is a parking brake retrofit.

But there's a solution to the problem.

The bracket design has been changed to use the existing mounting holes and keep the cables from being crushed or chafed by the lower control arm.

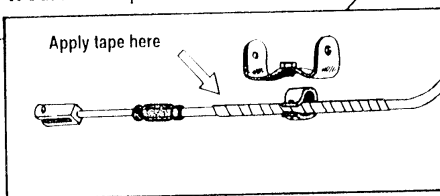
Order the right bracket with NSN 5340-01-394-2408, and the left bracket with NSN 5340-01-394-8496.

Until the brackets arrive, check the parking brake cables and clamps during each PMCS for chafing near the control arm. If you see damage, use this fix until your new brackets arrive:

1. Remove the clamp and discard if it's damaged.
2. Remove any old tape on the cable.
3. Wrap a 6-in piece of rubberized tape (NSN 9320-01-299-3332) in a spiral motion around the cable near the control arm.
4. Put the clamp back on.

EACH TIME YOU PULL PMCS, REWRAP THE CABLE IF YOU SEE DAMAGE

Apply tape here



PS 519

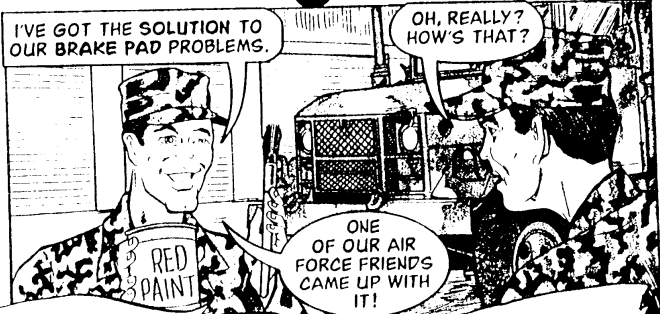
31

FEB 96

Paint Parking Brake Lever

I'VE GOT THE SOLUTION TO OUR BRAKE PAD PROBLEMS.

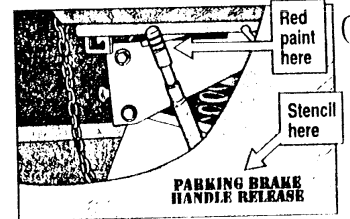
OH, REALLY? HOW'S THAT?



Dear Editor,

Some drivers leave the 2 1/2- and 5-ton truck's parking brake set while driving. That ruins brake shoes, leaving you with no emergency brakes.

Our unit had the same problem until we came up with this fix: Paint the parking brake's handle with red paint. Then stencil "Parking Brake Handle Release" in red letters on the truck's body next to the driver's seat.



No more engaged brakes, no more ruined brake pads.

TSGT Brian E. Eastman
224th JCSS
Brunswick, GA

FROM THE DESK OF THE Editor

Your idea sure puts the brakes on ruined shoes.

Chapter 13

WHEELS AND TRACKS

Functional
Group Code
1311-1313

8-4. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Runflat Spacer Installation

POC:

Mr. Ronald Hanebutt, AMSTA-IM-MTA, DSN 786-7151,
Commercial (816) r)74-7151 hanebutr@cc.tacom.army.mil

DEFICIENCY:

Difficulty installing the runflat spacer in the radial tires of the HMMWV.

COMMENTS:

To retain the original shape and flexibility of the radial tire and ensure easy installation of the runflat spacer, follow these guidelines:

- (1) Remove the tires from the manufacturer's packaging upon arrival.
- (2) Store the tires on their tread, and not on their sidewalls.
- (3) Store the tires at a warm room temperature.
- (4) If stored in a cold environment, bring the tires into a heated room 24 hours prior to installation making sure to stand the tires on their tread.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit

SUBJECT: Policy on Not Mixing Radial and Bias Ply Tires

POC: Mr. Ed Klisz, AMSTA-MTA, DSN 786-7379, Commercial (810) 574-7379

DEFICIENCY: The introduction of radial tires on newer vehicles or as alternatives to bias ply tires in the supply system has resurfaced the question on the Army's policy of "Not mixing radial and bias ply tires on the same vehicle or piece of equipment". This only applies to ground vehicles with pneumatic tires. It does not apply to vehicles with solid tires.

COMMENTS:

- A. As radial tires enter the system on newer versions of standard Army equipment, such as the HMMWV series and the M969A1 Fuel Tanker, the question arises if radial tires can be used on the older vehicle, and if so can they be mixed on the same vehicle. Likewise, as radial tires are introduced in the supply system as an alternative for bias tires, the same questions arise.
- B. Individual vehicle TM's should contain information on whether or not radial tires can be used on older vehicles, and if so, are there other items that must be replaced to accommodate radial tires. A review of several vehicle TM's showed that the data was there, but sometimes it was difficult to find.
- C. The Army's policy on 'Not mixing radial and bias ply tires' is found in TM9-2610-200-14 on page 2-4, paragraph 2-7.c. It currently states; 'Tires should be used in sets. Mixing bias, belted bias, and radial ply tires must be avoided. ... Radial ply tires should always be used in sets and under no circumstances should be mixed with bias tires. The problems encountered when mixing tire sizes and types on a vehicle are loss of steering control, inadequate vehicle handling, and potential mechanical damage. ... '

NOTE

The term "in sets" apparently caused some confusion in the field in that it could be taken to mean 'per axle' or 'on an axle'. The term 'in sets' is being replaced by 'on the same vehicle' in a change to the TM).

- D. Individual vehicle TM's vary in how they address the issue. At a minimum we plan to have a standard warning that says; 'Never mix radial ply tires with bias or belted bias tires on the same vehicle. The problems encountered when mixing tire sizes and types on a vehicle are loss of steering control, inadequate vehicle handling, and potential mechanical damage.' In many cases we would like to expand the coverage on tires to clearly emphasize the benefits of proper tire care and maintenance.
- E. We know that there is commercial literature out there that outlines under what specific circumstances radial and bias or belted bias tires can be mixed. We have talked to experts in both the tire and vehicle industry and the consensus is "No one RECOMMENDS mixing radial and bias or belted bias tires on the same vehicle." We have reviewed the literature and determined that there are so few occasions when mixing would be permitted on our vehicles, and the guidance is so limited, that the risk of error in applying the rules is too great.
- F. Our policy is "NEVER MIX RADIAL PLY TIRES AND BIAS OR BELTED BIAS TIRES ON THE SAME VEHICLE'

PUBLICATIONS AFFECTED: TM 9-2610-200-14 Numerous wheeled vehicle operator or unit maintenance TM's.

LEVEL OF MAINTENANCE Operator and Unit Maintenance

Tire Safety...

YOU DON'T TUG ON
SUPERMAN'S CAPE...



YOU DON'T SPIT INTO
THE WIND...



YOU DON'T PULL THE MASK
OFF THE OL' LONE RANGER...



... AND YOU DON'T MESS
AROUND WITH RIMS! NEVER
INFLATE A MULTI-PIECE RIM
WITHOUT...

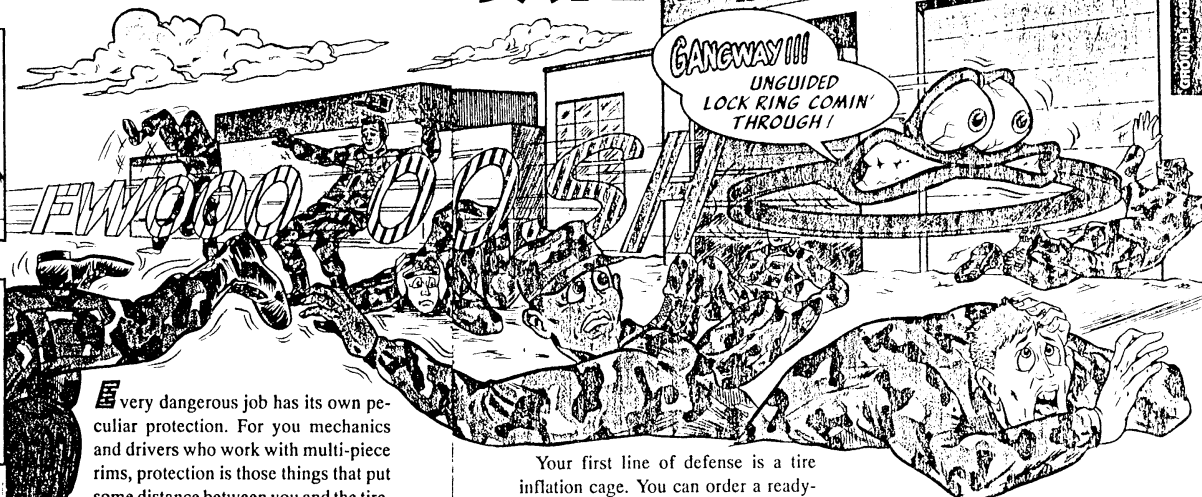
- AN INFLATION CAGE.
- A 10-FT AIR HOSE WITH
CLIP-ON CHUCK.
- PROPER TRAINING.

PS 494

10

JAN 94

AIR ON THE SAFE SIDE



Every dangerous job has its own peculiar protection. For you mechanics and drivers who work with multi-piece rims, protection is those things that put some distance between you and the tire.

Inflation Cage

Air puts tons of pressure against the rim's lock ring. If it blows off, and you're in the way—well, the rim can probably be used again.



Your first line of defense is a tire inflation cage. You can order a ready-made cage with NSN 4910-00-204-2448, or you can have one fabricated with 2 x 2 x 1/4-in angle iron, NSN 9520-00-277-4913.



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The plans are in Para 2-3 of TM 9-2610-200-14.

This cage will hold a tire as big as 14.00 x 24. By adding four inches to the width of the cage, you can inflate a tire up to 18.00 x 33.

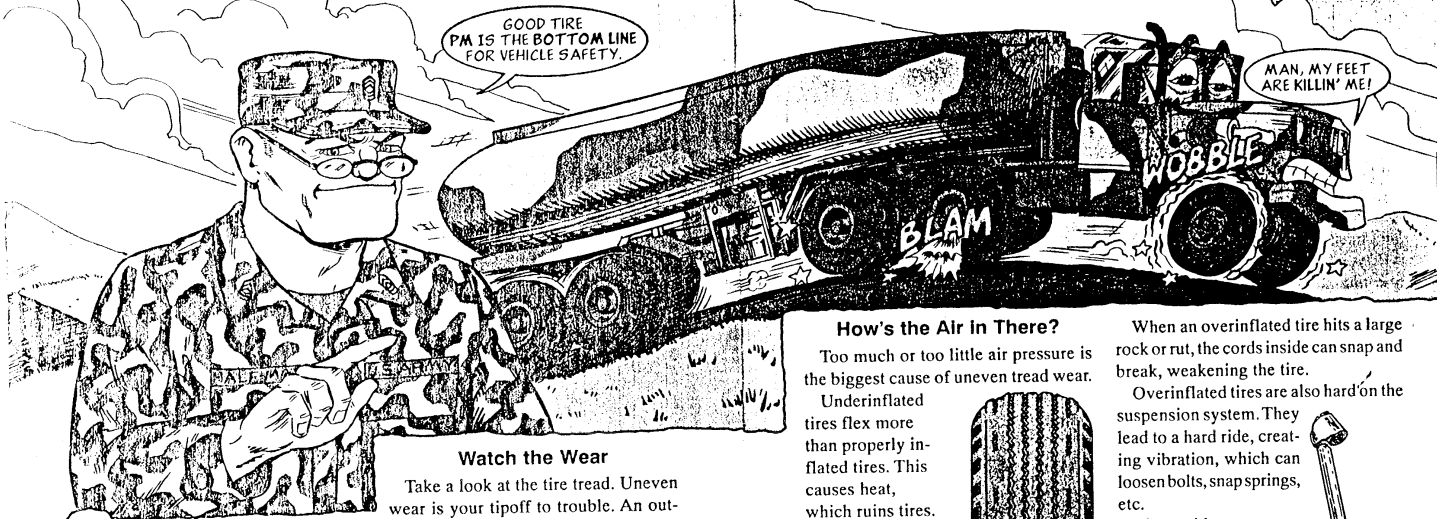
Of course, even if the tire is in a cage, don't stand near it. The force of an explosion can bow or break the angle iron, and even shear off the bolts anchoring the cage.

If you do have a wheel blow up in the cage, contact your local safety office. The Occupational Health and Safety Administration (OSHA) requires a cage inspection after a blowout. Your safety office should be able to help you handle it.



Tires...

PM Starts at Ground Level



Getting to the bottom of things, that's the secret of a good PM program. For a driver, the bottom is where the rubber meets the road — the tires.

Remember, it's not just tires that suffer if you forget to do PM. Tires affect several mechanical systems on your vehicle, like the brakes, wheels, suspension, and steering.

If one of these systems fails, you and your passengers or cargo could be damaged, too.

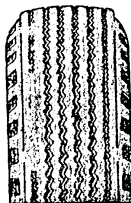
Your eyes and some simple tools are all you need to keep tires and vehicles out of danger.

Watch the Wear

Take a look at the tire tread. Uneven wear is your tipoff to trouble. An out-of-balance tire and wheel assembly, bad shocks, poor alignment, bum brakes, loose ball joints and other problems in the suspension system cause rapid and uneven tire wear.

Report uneven tire wear to your mechanic. He can find the cause before tires are ruined.

Uneven wear is a danger signal

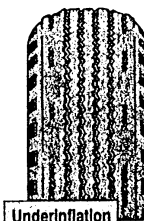


How's the Air in There?

Too much or too little air pressure is the biggest cause of uneven tread wear.

Underinflated tires flex more than properly inflated tires. This causes heat, which ruins tires. Underinflation shows itself as worn tread on both edges of the tire.

Overinflated tires don't flex enough. The center of the tire takes all the weight, causing rapid wear.



Underinflation



Overinflation

When an overinflated tire hits a large rock or rut, the cords inside can snap and break, weakening the tire.

Overinflated tires are also hard on the suspension system. They lead to a hard ride, creating vibration, which can loosen bolts, snap springs, etc.

Tires with extra wear on the center of the tread are probably overinflated.

Proper tire pressure for your vehicle is listed in the operator's manual.

Measure tire pressure every week. Ask your mechanic for the tire pressure gauge to measure the pressure in all tires — even the spare. You can ask your CO to get you your own gauge. It comes with NSN 4910-00-204-3170.



PS 503

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OCT 94

PS 503

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HMMWV...

Rim Shot?

Some 12-hole rims for HMMWV tires are missing a weld. They can blow apart when you inflate the tire, or when you're driving.

The rims are NSN 2530-01-336-5740 and are a part of wheel assembly kits, NSN 2530-01-361-4856.

If you have any 12-hole rims (all old rims have eight holes), look them over. There should be a weld on the inside of the rim between the bolt ring and inner rim half. The weld should go all the way around.

No weld, no good.

Be careful when handling rims with inflated tires. If they're not on a vehicle, deflate the tires before moving the wheel.

If the wheels are on the HMMWV, use a flashlight to look for the weld.

If you don't find the weld, mark the vehicle as NMC until the wheel's replaced. Deflate the tire before removing the wheel.

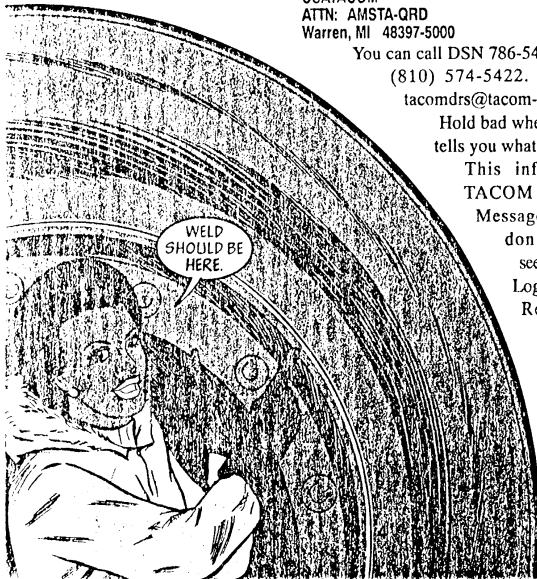
To get credit for bad wheel assemblies, send a Product Quality Deficiency Report (SF 368) to:

USATACOM
ATTN: AMSTA-ORD
Warren, MI 48397-5000

You can call DSN 786-5422 or commercial (810) 574-5422. E-mail goes to tacomdrs@tacom-cmh1.army.mil

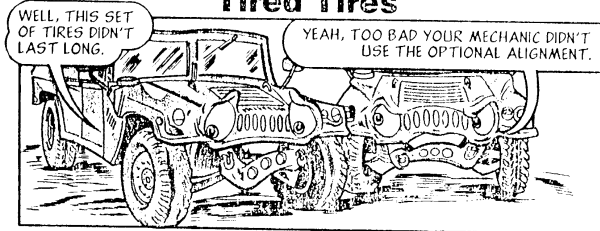
Hold bad wheels until TACOM tells you what to do with them.

This information is in TACOM Safety of Use Message 94-14. If you don't have a copy, see your TACOM Logistics Assistance Representative or write Half-Mast.



JAN 95

Tired Tires



As everyone knows, whether on our POVs or Humvees, tires never last long enough.

Even if you keep Humvee tire pressure up and the front end aligned, tires can still wear excessively on the outer edges.

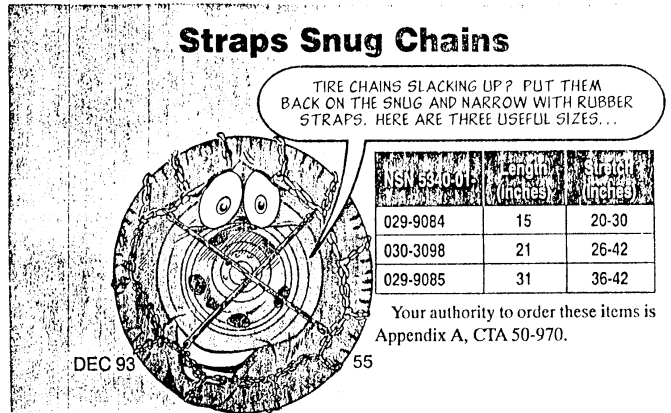
The tire experts at the truckers' top shop say tires wear out before their time because mechanics align the front end while the truck is empty. They say you should put on the load the truck normally carries—say a half ton. Then align the front end to the optional specifications so you'll get maximum wear from the tires.

You'll find the optional alignment procedure in Table 8-2(b) in the -20-2 TM.

DEC 93

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Straps Snug Chains

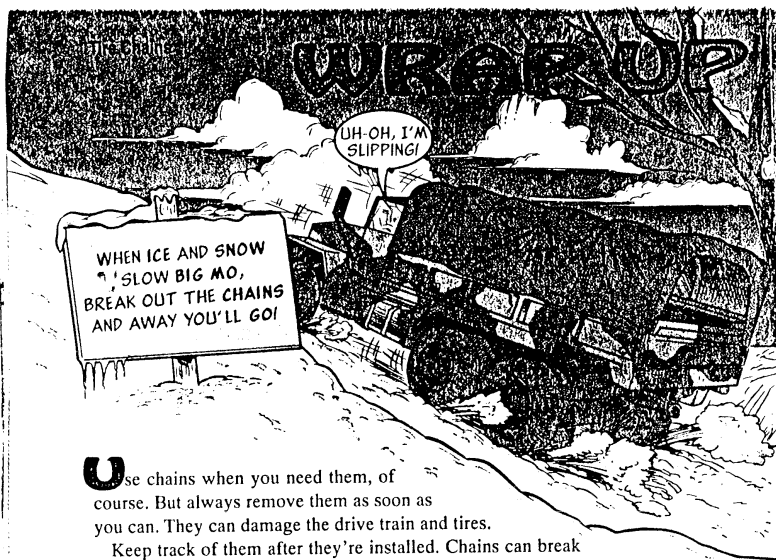


NSN 5310-01-	width (inches)	stretch (inches)
029-9084	15	20-30
030-3098	21	26-42
029-9085	31	36-42

Your authority to order these items is Appendix A, CTA 50-970.

DEC 93

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Use chains when you need them, of course. But always remove them as soon as you can. They can damage the drive train and tires.

Keep track of them after they're installed. Chains can break and wipe out a brake line or tear up the vehicle.

M939A2s, HMMWVs

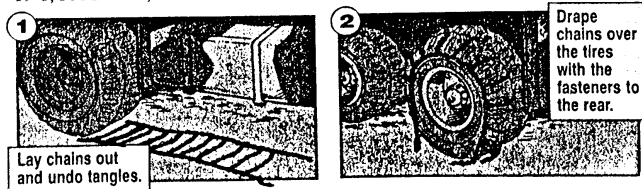
Forget using chains on your M939A2-series 5-tonners since they have the Central Tire Inflation System (CTIS).

The chains can tear up the extra air lines used by the CTIS.

You can use chains on the HMMWV's runflat tires. Be sure to use the chains on all four tires. You risk drive train damage if you install chains only on one axle.

Putting 'em On

There are several ways to install tire chains. One way is spelled out on Page 19-6, FM 21-305, Manual for the Wheeled Vehicle Driver, like so:



Lay chains out and undo tangles.

Drape chains over the tires with the fasteners to the rear.

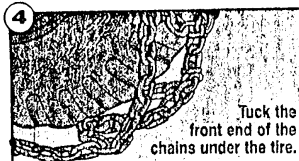
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OCT 93

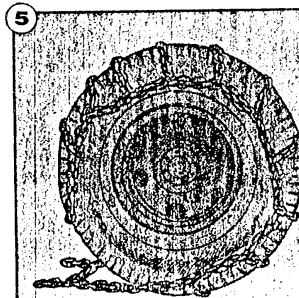
GO WOES



Keep hooks on cross-chain away from the tire.



Tuck the front end of the chains under the tire.

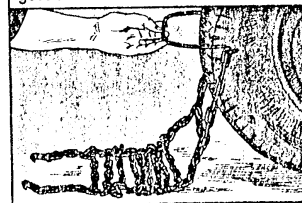


Drive ahead until the fasteners are at hub level. Fasten the inner chain first... and then the outer. When you've got all your chains installed, drive a short distance and then check for chain tightness.

some air out and reinflate the tires after you put chains on. They'll be too tight. Chains need to be able to creep on the tire.

Some people think there's an easier method. You let the wheel put the chain on. It's pretty much like the instructions that come with lot of civilian tire chains which come with a special clip or applicator for hooking one end of your chain to the tire. You can make a clip from some rod or scrap metal. Just make sure it's got a little spring to it so it'll grab hold of the tire.

Hang the end links of your chain on the clip. Press the clip onto the tire at hub level. Pile the chain neatly close to the tire... so it'll peel off when the wheel goes around.



Make sure the cross-chain hooks face up... so they'll face away from the tire when the chain's installed.



Drive ahead until the wheel makes a complete turn. Pull the clip off, connect the chain ends!

You can also lay your chains out in front of your vehicle and drive on the chains. Then fasten the chains. Remember, fasteners to the rear, cross-chain hooks away from the tires.

Get chains as tight as you can by hand. Don't use tools. And never let

OCT 93

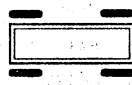
11

CS MORE

Chain Positions

Chains in the wrong places won't do much good—and can cause damage. Best for traction, starting and stopping is chains all around, even on non-driven front wheels.

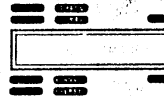
If your vehicle has a non-drive axle, put chains on the drive axle or axles.



If you have only single wheel chains, put 'em on the outside tires on front tandem axles.



If you have a tandem drive rig, but you have chains for only 1 axle, put them on the front tandem axle.



Trailers don't usually get chains, but you may need them if roads are real slick. Put them on the rear axle if the trailer's got tandem axles.



Maintenance

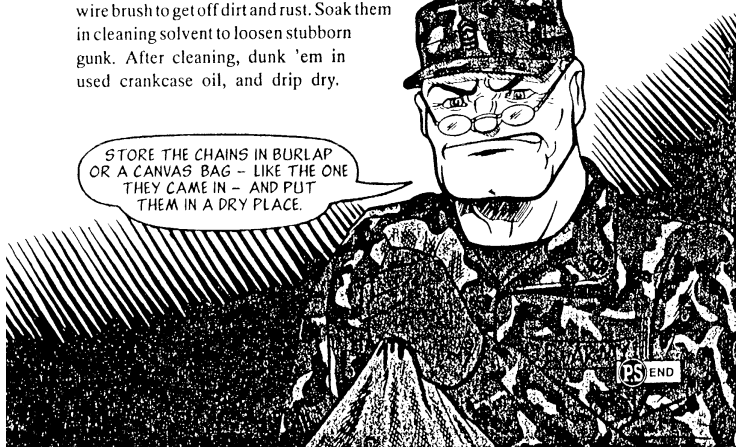
Check your chains before you put 'em on. You'll save taking them off for repair. Repair any broken or worn cross-chains.

Check your chains before you pull out of the motor pool.

At the end of the season, clean the chains with a wire brush to get off dirt and rust. Soak them in cleaning solvent to loosen stubborn gunk. After cleaning, dunk 'em in used crankcase oil, and drip dry.



STORE THE CHAINS IN BURLAP OR A CANVAS BAG - LIKE THE ONE THEY CAME IN - AND PUT THEM IN A DRY PLACE.



Tire Chains ...

TO USE OR NOT TO USE— AND WHERE?

It'd be real simple if all Army vehicles could be equipped with tire chains when road conditions warrant their use.

Unfortunately they can't. Some vehicles can't use chains at all, and others can use chains only on specific axles.

Follow the general rules found in FM 21-305, Manual for the Wheeled Vehicle Driver (Aug 93), for the use of tire chains.

Then, follow the specific rules found in each vehicle's -10 TM. These rules may not mirror those in the FM. If there's a difference, just remember that the -10 rules are the ones you follow.

Here are some exceptions to the rules:

- ✱ **M939A2-series 5-ton:** use no chains. The central tire inflation system (CTIS) deflates tires to provide traction on snow/ice.
- ✱ **M939A1-series 5-ton:** use chains only on the intermediate axle.
- ✱ **Palletized loading system (PLS):** use chains only on axles No. 3 and 4 (non-steering axles).
- ✱ **HEMTT:** use chains only on both rear axles. On M978 tankers, never use chains when driving on paved surfaces. That could cause sparks.
- ✱ **HMMWV:** use chains on all four wheels to prevent drive train damage. It's OK to use chains on runflat tires, too.



Wheeled Vehicles...

“TIRING” WORK MADE EASIER

Mechanics, you can make tires, especially HMMWV tires, easier to work with by following these simple tips.

- 🔧 Remove tires from the restrictive manufacturer’s packaging as soon as you can after they get to the motor pool.
- 🔧 Store the tires on their tread, not on their side.
- 🔧 Keep tires at room temperature, if possible. Tires that sit in cold weather should come indoors at least 24 hours before they’re mounted. This will make installing a runflat spacer, for example, much easier for your HMMWV maintainers.

From PS Magazine

Chapter 14

STEERING

Functional
Group Code
1401-1411

3-12. Tactical Trucks**MODEL:**

M998 Series Vehicles

SUBJECT:

Intermediate Steering Shaft U-Joint Replacement

POC:Ms. Jody McInerney, AMSTA-MTA, DSN 786-7346,
Commercial (313) 574-7346**COMMENTS:**

Presently, units must replace the intermediate steering shaft if the U-joints are worn. From a maintenance standpoint, we feel lack of lubrication causes increased wear of U-joints and leads to premature replacement of the steering shaft. However, from a user standpoint, we are aware that it would save you money, if you were able to repair the steering shaft. Therefore, we are changing our previous decision and making the U-joints replaceable.

MATERIALS/PARTS:

Removal and Installation of the U-joints can be accomplished by using the following materials and procedures:

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QUANTITY</u>
2520-00-352-2168	Center Parts let	1
5120-01-210-4096	Universal Joint Bearing Kit	1

PROCEDURE:Equipment Condition

Intermediate Steering Shaft removed. (Refer to TM9-2320-280-20-2, Para 8-17)

A. Removal

CAUTION

Do not drop bearing cups. Needle bearing can be easily lost.

3-12. Tact. Trucks cont.

- (1) Remove grease fitting (6) from cross (4). (see figure 3-36)
- (2) Remove four bearing cups (1) from cross (4).
- (3) Remove four snap rings (2) from yoke (5).
- (4) Position intermediate steering shaft (3) in vise with 1-1/8" socket between vise jaw and bearing cup (1) being removed. Ensure open end of socket is facing bearing cup (1).
- (5) Place 11/16" socket between opposite bearing cup (1) and visejaw. Ensure open end of socket is facing vise jaw.
- (6) Press bearing cup (1) out of yoke (5) and remove bearing cup (1) from cross (4).
- (7) Reverse position of sockets and press remaining bearing cup (1) out of yoke (5).
- (8) Remove cross (4) from yoke (5).

B. Assembly

CAUTION

Ensure grease fitting on cross faces yoke. Damage to equipment will result if Improperly installed.

- (1) Install cross (4) into yoke (5). (see figure 3-36)
- (2) Install bearing cup (1) into yoke (5).

CAUTION

Ensure bearing cup is aligned with yoke before pressing in with vise. Damage to cross and bearing cups will result if forced into yoke.

- (3) Place yoke (5) in vise with 11/16" socket between vise jaw and bearing cup (1). (see figure 3-36)
- (4) Press bearing cup (1) into yoke (5) far enough to install snap ring (2), and install snap ring (2) into yoke (5).
- (5) Install bearing cup (1) into yoke (5).
- (6) Place yoke (5) in vise with 11/16" socket between bearing cup (1) and vise jaw.
- (7) Press bearing cup (1) into yoke (5) far enough to install snap ring (2), and install snap ring (2) into yoke (5).
- (8) Install four bearing cups (1) on cross (4).
- (9) Install grease fitting (6) into cross (4).

3-12. Tact Trucks cont. Follow-on Task

Install Intermediate Steering Shaft. (Refer to TM9-2320-280-20-2, Para 8-17)

PUBLICATIONSAFFECTED:

TM9-2320-280-34P

TM9-2320-280-20P

TM9-2320-280-20-2

LEVEL OF MAINTENANCE:

Unit

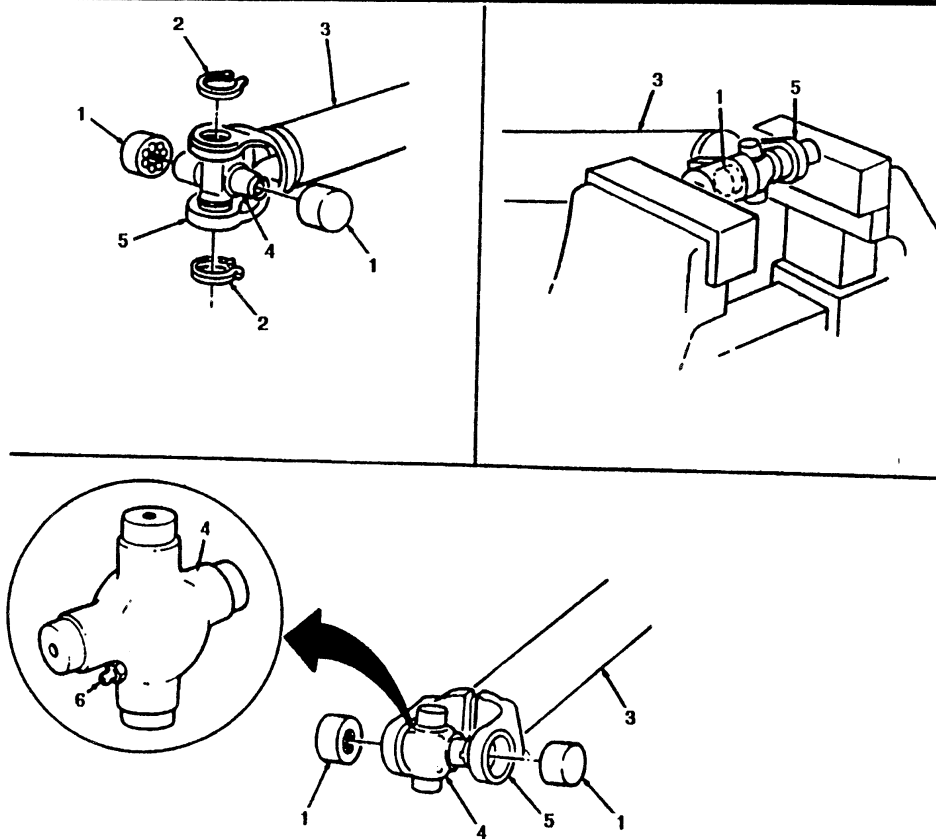


FIGURE 3-36

3-10. Tactical Trucks

MODEL:

All HMMWV Models

SUBJECT:

Loose Intermediate Steering Shaft

POC:

Mr. Daniel Dudek, AMSTA-MTA, DSN 786-7416,
Commercial (810) 574-7416

EDITOR'S NOTE:

This is a reprint of the same article that was published In TB 43-0001-39-8, dated 31 Mar 94, chapter 4.

- torque values have been changed

DEFICIENCY:

The original article printed In TB 43-0001-39-8, dated 31 Mar 94 calls out an Improper torque. This article Is a reprint with correction.

COMMENTS:

Reports from the field indicate that users may not be replacing and/or properly torquing the locknuts used on the intermediate steering shaft. Failure to replace and properly torque the locknut can cause premature wear of other components (such as worn splines and U-joints). When you replace the intermediate steering shaft or steering gear box, you need to remember to discard the old locknut and put a new one on. Also, properly torque the locknut to 40-50 lb-ft* (54-68 N • m). Following these maintenance procedures will help to keep your steering components In good shape.

*NOTE: TM 9-2320-280-20-2 dated Jan 90 with change 4, paragraph 8-17, page 8-44 changes the torque to 40-50 lb-ft (54-68 N • m).

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE

UNIT

SUBJECT:

Steering Column

POC:

Ms. Jody McInerney, AMSTA-MTA, DSN 786-7346,
Commercial (810) 574-7346 mcinernj@cc.tacom.army.mil

DEFICIENCY:

Steering Column, P/N (81263) 1419, NSN 2530-01-185-8154, used on vehicles with serial # 1 thru 99,999 is no longer available. If you order this item, you will receive P/N (81263) 1493, NSN 2530-01-314-4470.

COMMENTS:

A. Steering Column P/N 1493, has a built-in safety feature. New shoulder bolts (P/N 12342440) are needed when installing the P/N 1493 column. Here's a complete list of the parts you'll need:

MANDATORY PARTS:

<u>NSN/Part No.</u>	<u>Item Name</u>	<u>QTY</u>
(19207)12342440	Shoulder Bolt	2
5310-00-935-9021	Self-Locking Nut	1
5310-00-637-9541	Lockwasher	1
5310-01-315-3403	Self-Locking Nut	1
5310-00-061-4650	Self-Locking Nut	2

The following parts can be re-used from the old steering column:

<u>NSN/Part No.</u>	<u>Item Name</u>	<u>QTY</u>
5310-01-257-7719	Washer	2
5315-01-201-3592	Pin	1
5310-01-188-0745	Key Washer	1

To install the new steering column, follow the replacement procedures for vehicles with serial number 100,000 and above (P/N 1493) in TM9-2320-280-20-2 (paragraph 8-16).

B. The new steering column (P/N 1493) was designed to reduce chest injuries in the event of an accident. Excessive force on the steering column can lead to premature failure of the built-in safety features. To help prevent this from occurring you can make sure to avoid using force on the steering wheel and install new rigidity brackets.

C. We've developed a steering column replacement kit that includes the steering column, hardware, and rigidity brackets for vehicle serial numbers 1-99,999. The NSN is 2530-01-395-9584. You can order the following parts to install the rigidity brackets, if the kit is not available.

3-19. Tact. Trucks cont.	NSN	Item Name	QTY
	2530-01-383-5740	Bracket	1
	2530-01-384-7154	Bracket	1
	5310-00-061-4650	Locknut	1
	5310-00-124-9265	Nut	1
	5305-00-225-3843	Screw	1
	5305-00-582-9501	Screw	1
	5310-00-809-4058	Washer	2

For instructions on how to Install the rigidity brackets, please refer to TM 9-2320-280-20-2 (paragraph 8-16).

D. An article similar to this one appeared in TB 43-0001-39-1, dated Jun 94, paragraph 3-1O. Please NOTE there is an error in the previous article. The NSN (5305-00-709-8542) for the Shoulder Bolt is incorrect. The correct P/N is (19207) 12342440.

PUBLICATIONS AFFECTED:

TM9-2320-280-20

LEVEL OF MAINTENANCE:

Unit

3-10. Tactical Trucks

MODEL:

HMMWV M998 Series

SUBJECT:

Steering Column

POC:

Mr. Daniel Dudek, AMSTA-MTA, DSN 786-7416,
Commercial (810) 574-7416

DEFICIENCY:

Steering columns wears and cracks at mounting points and becomes loose.

3-10. Tact. Trucks cont. COMMENTS:

A. A modification Work Order (MWO) is being developed to inspect steering columns for movement and the repair of those with excessive movement or damaged mountings. Since efforts for development and implementation of an MWO take some time, the following procedures are provided in advance of the MWO.

B. The following procedures provide methods to inspect steering columns, install rigidity brackets, and to replace the steering column. If you choose to apply these procedures we would like you to report to us your unit, the vehicle serial number, and the action taken. The Information should be reported on a DA2407, multiple vehicles can be reported on a single DA2407. The information should be sent to:

Commander,
U.S. Tank-Automotive Command
Attn: AMSTA-MTA
Warren, MI 48397-5000

MATERIALS/PARTS:

The following parts are required for shoulder bolt replacement:

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
5310-01-315-3403	Nut	2
5305-00-709-8542	Shoulder Bolt	2
5310-00-809-4085	Washer	2

The following parts are required for adding rigidity brackets to a steering column:

<u>PART NUMBER/NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
12342875	Bracket	1
12342876	Bracket	1
5310-00-061-4650	Locknut	1
5310-00-124-9265	Nut	1
5305-00-225-3843	Screw	1
5305-00-582-9501	Screw	1
5310-00-809-4058	Washer	2

3-10. Tact. Trucks cont. The following parts are required for steering column replacement:

<u>PART NUMBER/NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
12342875	Bracket	1
12342876	Bracket	1
5310-00-061-4650	Locknut	3
5310-00-124-9265	Nut	1
5305-00-225-3843	Screw	1
5305-00-582-9501	Screw	1
5310-00-637-9541	Lockwasher	1
5310-00-809-4058	Washer	2
5310-00-809-4085	Washer	2
5305-00-709-8542	Shoulder Bolt	2
5310-00-935-9021	Nut	1
5310-01-188-0745	Key Washer	1
5315-01-201-3592	Pin	1
2530-01-314-4470	Steering Column	1
5310-01-315-3403	Nut	1

PROCEDURE:

NOTE

Section I is an inspection procedure to determine if a steering column requires replacement or the addition of rigidity brackets.

Section II is a procedure to add rigidity brackets to a steering column that originally did not have rigidity brackets.

Section III is a procedure to replace a steering column with a new steering column.

SECTION 1. STEERING COLUMN INSPECTION PROCEDURE

NOTE

When performing step "A", use a ruler (2) positioned on steering column (5) and mark a reference line (3) on dash (4) to check vertical movement. (see figure 3-13)

3-10. Tact. Trucks cont.

- A. Using moderate hand force, move steering wheel (1) up and down. Steering column (5) should have 0.125" or less movement from center position to highest and lowest vertical points. (see figure 3-13)

NOTE

If the steering column inspected was model 12338621, without tab inserts, and the movement exceeded 0.125", replace steering column. (Refer to Section 111)

If the steering column inspected was model 12338621, without tab inserts, and the movement exceeded 0.125" or less, discontinue inspection; movement is within acceptable limits.

- B. Record data found from performing step "A".

NOTE

The remainder of this inspection procedure applies to 12338621-1 steering columns with tab inserts.

- C. Remove two existing shoulder bolts (15), washers (16), and nuts (17) from steering column (7). (see figure 3-15)
- D. Check tab Inserts (2) at end of steering column (1) for paint and metal cracking. (see figure 3-14) If cracking is present on or around tab Inserts (2), discontinue inspection procedure and replace steering column. (Refer to Section III.)

NOTE

Check shoulder bolts (3) removed in step "C" for "mushrooming" around shaft area (4) of shoulder bolt (3). (see figure 3-14) If mushrooming is present, perform step "E". If mushrooming is not present, perform step "F".

- E. Discard two shoulder bolts (15), washers (16), and nuts (17). Secure steering column (7) to bracket (4) with two NSN 5305-00-709-8542 shoulder bolts (15), NSN 5310-00-809-4085 washers (16), and NSN 5310-01-315-3403 nuts (17). Tighten nuts (17) to 10 lb-ft (14 N•m). (see figure 3-15)
- F. Install two existing shoulder bolts (15), washers (16), and NSN 5310-01-315-3403 nuts (17). Tighten nuts (17) to 10 lb-ft (14 N•m).

3-10. Tact. Trucks cont.

NOTE

If vertical movement of steering column exceeded 0.125" in step 'A', then install rigidity brackets to steering column. (Refer to Section II.)

SECTION II. INSTALLATION OF RIGIDITY BRACKETS ON STEERING COLUMN

- A.** Remove screw (8), nut (14), and ground lead 57C (13) from steering column (7). (see figure 3-15)
- B.** Secure ground lead 57C (2) and 12342875 rigidity bracket (5) to steering column (3) with NSN 5305-00-582-9501 screw (4) and NSN 5310-00-124-9265 nut (1). Do not tighten nut (1). (see figure 3-16)
- C.** Secure 12342876 bracket (8) to bracket (5) and steering column (3) with NSN 5305-00-225-3843 screw (9), two NSN 5310-00-809-4058 washers (7), and NSN 5310-00-061-4650 locknut (6). Tighten nut (6) to 10 lb-ft (14 N•m).
- D.** Tighten nut (1) to 5 lb-ft (7 N•m).

SECTION III. STEERING COLUMN REPLACEMENT

- A.** Remove steering column. (Refer to TM9-2320-280-20.)
- B.** Secure NSN 2530-01-314-4470 steering column (7) to bracket (4) with two NSN 5305-00-709-8542 shoulder bolts (15), NSN 5310-00-809-4085 washers (16), and NSN 5310-00-061-46 50 nuts (17). Tighten nuts (17) to 10 lb-ft (14 N•m). (see figure 3-15)
- C.** Secure steering column (7) to bracket (4) with NSN 5315-01-201-3592 pin (5), NSN 5310-01-188-0745 key washer (3), NSN 5310-00-637-9541 lockwasher (2), and NSN 5310-00-935-9021 nut (1). Tighten nut (1) to 14 lb-ft (19 N•m).
- D.** Secure intermediate shaft (12) to steering column (7) with existing screw (11), two washers (10), and NSN 5310-01-315-3403 nut (9). Tighten nut (9) to 45 lb-ft (61 N•m).
- E.** Connect lead 25A (18) to steering column connector (6).

NOTE

If steering column being replaced had rigidity brackets installed, reuse existing brackets and all hardware except for two NSN 5310-00-061-4650 nuts that require replacement. Perform step "F".

If steering column being replaced did not have rigidity brackets installed, acquire parts needed and perform step "F".

3- 1 0. Tact. Trucks cont.

- F. Secure ground lead 57C (2) and 12342875 rigidity bracket (5) to steering column (3) with NSN 5305-00-582-9501 screw (4) and NSN 5310-00-124-9265 nut (1). Do not tighten nut (1). (see figure 3-16)
- G. Secure 12342876 rigidity bracket (8) to bracket (5) and steering column (3) with NSN 5305-00-225-3843 screw (9), two NSN 5310-00-809-4058 washers (7), and NSN 5310-00-061-4650 locknut (6), Tighten nut (6) to 10 lb-ft (14 N•m).
- H. Tighten nut (1) to 5 lb-ft (7 N•m).
- I. Install directional signal control. (Refer to TM9-2320-280-20.)
- J. Install steering wheel. (Refer to TM9-2320-280-20.)

PUBLICATIONS AFFECTED:

TM9-2320-280-20

LEVEL OF MAINTENANCE:

Unit

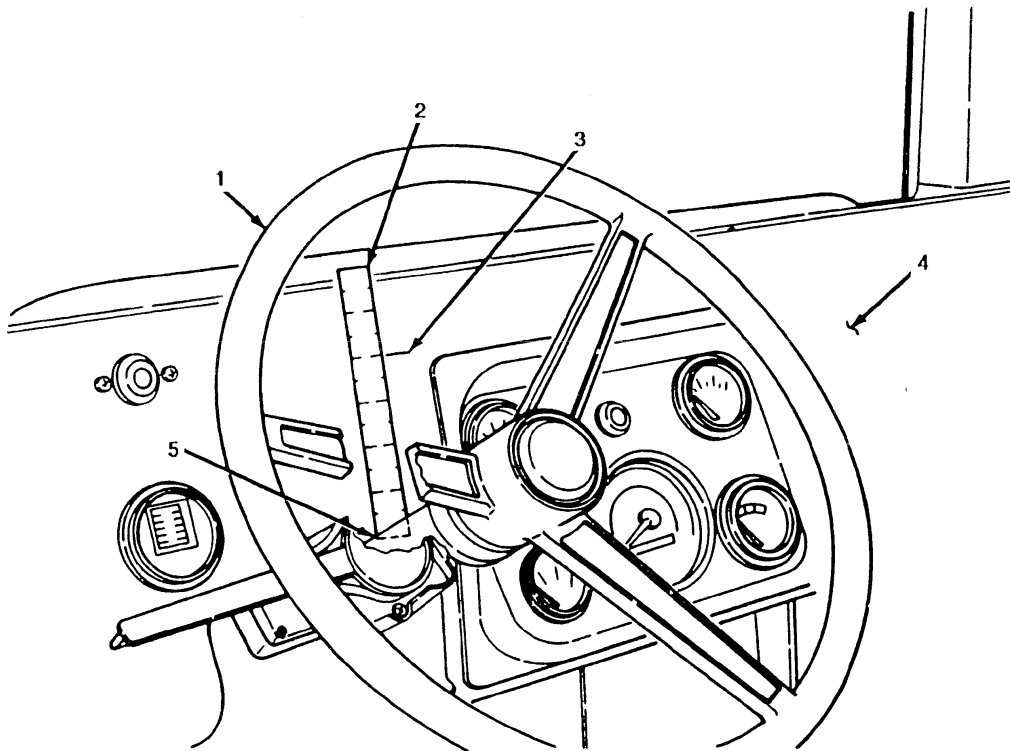


FIGURE 3-13

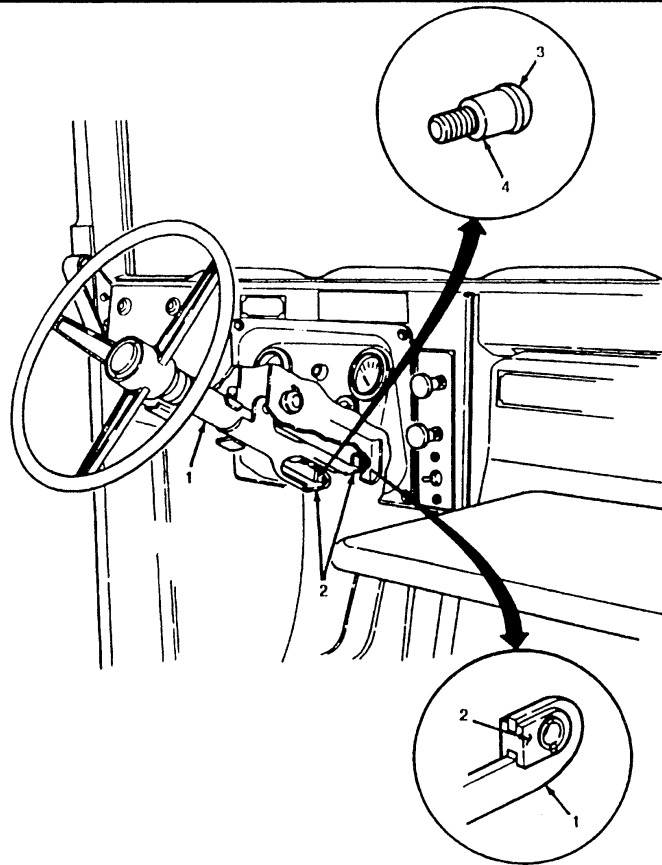


FIGURE 3-14

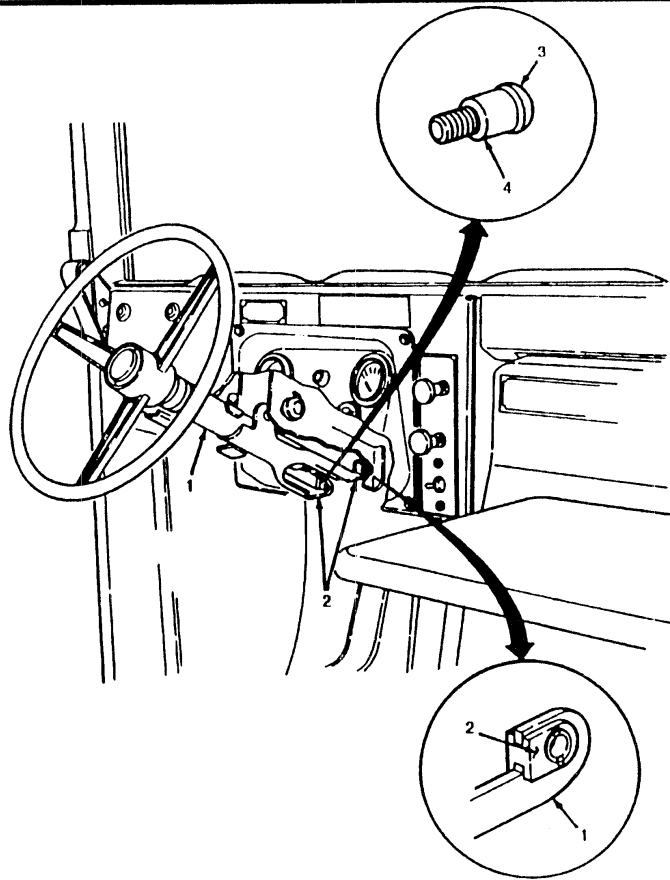


FIGURE 3-14

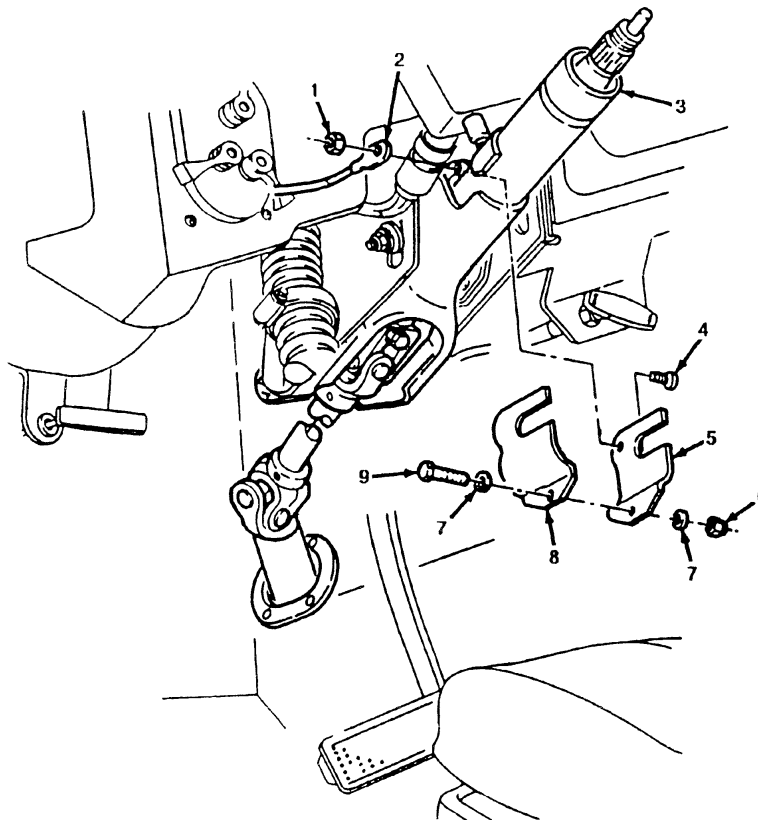


FIGURE 3-16

3-9. Tactical Trucks

MODEL:
HMMWV

SUBJECT:
Power Steering Bleed Procedures

POC:
Ms. Patricia Grashik, AMSTA-IM-HLA, DSN 786-5225,
Commercial (810) 574-5225, grashikp@cc.tacom.army.mil

DEFICIENCY:
The current bleed procedures in TM9-2320-280-20-2, dated Jan 96, Para B-29, may not expel all air out of the steering system.

COMMENTS:
We are aligning our bleeding procedures with those recommended by Saginaw Steering Systems, the steering system vendor.

PROCEDURES:

NOTE

Before bleeding the steering system inspect to ensure that hoses are not touching vehicle body or other components and all connections are tight.

1. Shut engine off. (TM9-2320-280-10)
2. Turn steering wheel full left.
3. Raise and secure hood.
4. Fill fluid reservoir to "FULL COLD" level. (TM9-2320-280-20)
Leave cap off.
5. Raise front wheels off ground. (TM9-2320-280-20)
6. Turn steering wheel left and right holding wheels at steering stops for five seconds at least 40 times.

NOTE

Power steering fluid must be free of bubbles and foam. If bubbles or foam are noted, it could be an indication of a loose connection or leaky O-ring.

3-9. Tact. Trucks cont.

7. Check fluid. If any bubbles are seen, repeat step 5.
8. Start engine. With engine idling, add power steering fluid, if necessary. (TM9-2320-280-10)
9. Install reservoir cap.
10. With wheels to center, lower front wheels to ground. (TM9-2320-280-20)
11. Keep engine running for two or three minutes. Turn steering wheel left and right.

NOTE

It pump is noisy, recheck hoses for possible contact with vehicle body or engine. If no contact is found and noise continues, switch engine off and re-pressurize system by following steps 12 and/or 13.

12. Remove reservoir cap. Wait for system to cool. Reinstall reservoir cap. Start engine and check pump for noise, if noise is still present continue to step 13. If noise stopped, proceed to step 14.
13. Turn engine off. Remove fluid from reservoir using a suction device. Refill reservoir with clean, cool fluid. Install reservoir cap. Start engine and check pump for noise. If noise is still present, replace power steering pump. (TM9-2320-280-20)
14. Turn engine off. (TM9-2320-280-10)
15. Check power steering level. (TM9-2320-280-10)
16. Lower and secure hood. (TM9-2320-280-10)
17. Operate vehicle and check for proper steering operation. (TM9-2320-280-10)

PUBLICATIONS AFFECTED:

TM9-2320-280-20

LEVEL OF MAINTENANCE:

Unit

4-4. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Power Steering Hose Clamps

POC:

Mr. Eric Sutman, AMSTA-MTA, DSN 786-7151,
Commercial (313) 574-7151

DEFICIENCY:

Power steering hoses pull away from their fittings, causing loss of power steering fluid. This results in loss of power assist during steering and braking.

COMMENTS:

A. We've investigated this problem and found that the power steering hose clamps used on HMMWVs produced between Jan 90 and Jan 93 can become loose. This allows the hose to pull away from the flared fittings. The vehicle manufacturer is now using a better clamp.

B. On vehicles experiencing this problem, replace the clamps with the clamps called out in TM 9-2320-280-20P, Figure 132. Clamps received through the supply system will keep the hose from pulling away from the fittings.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit

4-8. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Power Steering System

POC:

Mr. Keith J. Barthlow, AMSTA-IM-MTA, DSN 786-8288, Commercial (810)
574-8288 barthlok@cc.tacom.army.mil

DEFICIENCY:

Users report that power steering hoses come off at the fittings by the solenoid control valve and fan drive.

This can result in a loss of power assist during steering and braking.

COMMENTS:

We published an article in TB 43-0001-39-8 (Mar 94) that advised of this deficiency. The article said to replace the hose clamps with the clamps called out in TM9-2320-280-20P. Figure 132. While this information is still good and should resolve the problem, we recently completed an evaluation concerning the use of multi-barbed fittings and are planning to use them in future production. If you are still experiencing any problems or desire to use them, here are the NSN'S:

1. For Figure 131 (Item 3) and Figure 132 (Item 1) in TM9-2320-280-20P, use NSN 4730-00-136-2018 for the multi-barb fitting.
2. For Figure 132 (Item 2), use NSN 4730-00-722-5194.

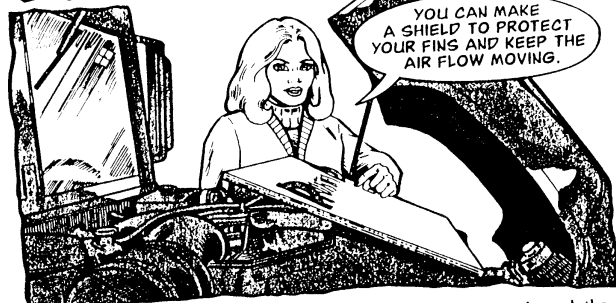
PUBLICATIONS AFFECTED:

TM9-2320-280-20P

LEVEL OF MAINTENANCE:

Unit

Protect Oil Cooler Fins



If the fins on your HMMWV's oil cooler get bent, and airflow through the cooler and radiator stops, the engine and transmission can overheat. Fins get bent because mechanics lean or crawl onto the oil cooler when they pull engine PM or adjust belt tension.

You can stop fin bending by making a shield to protect the oil cooler fins.

You need a piece of 3/4-in plywood cut like so:

These dimensions are approximate—you may need to adjust them to your HMMWV.

Round off the edges and paint the board to prevent splinters. Stencil "NO STEP" on each side of the board.

To use the shield, remove the eye-hook seals and slip the shield over the two lifting rings, laying it flat on the oil cooler frame. The rings will hold the shield in place.

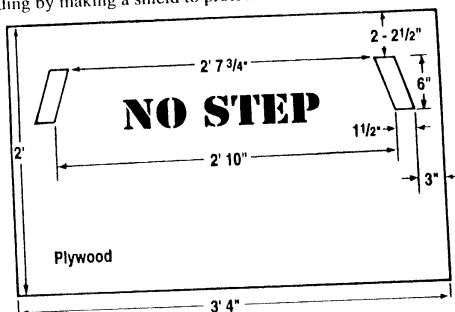
Never use the shield while the engine is running because it stops air flow and causes engine overheating.

After using the shield, replace the eyehook seals.

PS 519

28

FEB 96



WV...

Lock Down Steering Shaft

When you replace the Humvee's intermediate steering gear or gear box, mechanics, always use new locknuts and the correct torque.

Locknuts form to the bolt when first put on. They will work loose if used over and over. Likewise, if you don't use the correct torque on the new locknuts, they can still work loose.

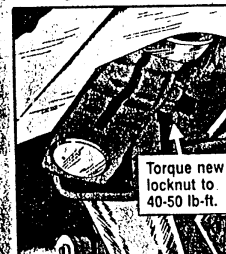
Once a locknut works loose, not only does steering control suffer, but U-joints and steering gear splines are damaged.

Replace the old locknuts, NSN 5310-00-840 6222, and torque the new ones to 40-50 lb-ft.

PS 502

19

SEP 94



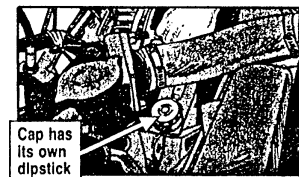
DON'T FILL 'ER UP

When you check the hydraulic fluid level in your Humvee's power steering pump, use the dipstick.

You can't just eyeball the level and fill the reservoir to the top. That blows seals, causing leaks that KO the power steering system. Overfilling also speeds wear on the pump.

Check the level when the engine is cold. Clean the area around the cap before removing it. The pump cap has

its own dipstick. Keep fluid between the COLD and HOT marks. If it's below COLD, add enough to bring it between the two marks.



Good Caps

Dear Editor,

When HMMWV repairmen put on a new power steering pump, they should hang onto the plastic caps that come with the new pump.

They're perfect for capping the oil cooler lines when you pull the HMMWV radiator.

SPC Joshua Cuoio
Schofield Barracks, HI

FROM THE DESK OF THE Editor

We tip our caps to you. The caps are a handy item to keep in your toolbox. In addition, NSN 5340-00-450-5718 will get you a whole selection of caps and plugs for about \$10.



8

OCT 96

Page 14-22

Chapter 15

FRAME AND TOWING ATTACHMENTS

Functional
Group Code
1501-1503

4-5. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Maintenance Level Change for Rear Crossmember Replacement

POC:

Mr. Keith Barthlow, AMSTA-IM-MTA, DSN 786-8288,
Commercial (810) 574-8288 barthlok@cc.tacom.army.mil

DEFICIENCY:

Currently the rear crossmember is replaced by Direct Support.

COMMENTS:

We are changing the maintenance level for rear crossmember replacement from Direct Support to Unit. Until the procedures are moved to TM9-2320-280-20, unit maintenance can replace the rear crossmember using the following procedure:

MATERIALS/PARTS:**NOMENCLATURE****PART NUMBER****NSN**

Locknut	(96906) MS51943-39	5310-00-488-3889
Flatwasher	(06032) 2310-0143-001	5310-01-121-1703
Capscrew	(80204) B1821BH050C125N	5305-00-071-2067
Channel, Structural Frame	(19207)12338193	9520-01-175-7222

PROCEDURES:**A. REMOVAL**

Remove four locknuts (3), washers (2), capscrews (5), and washers (2) securing rear crossmember (1) to rear crossmember mounting brackets (4) and remove rear crossmember(1). Discard locknuts (3). (see figure 4 - 1)

4-5. Tact. Trucks cont.

B. INSTALLATION

Install rear crossmember (1) to rear crossmember mounting brackets (4) and secure with four washers (2), capscrews (5), washers (2), and locknuts (3). Tighten locknuts (3) to 90 lb-ft (122 N•m). (see figure 4-1)

PUBLICATIONS AFFECTED:

TM9-2320-280-20

LEVEL OF MAINTENANCE:

Unit

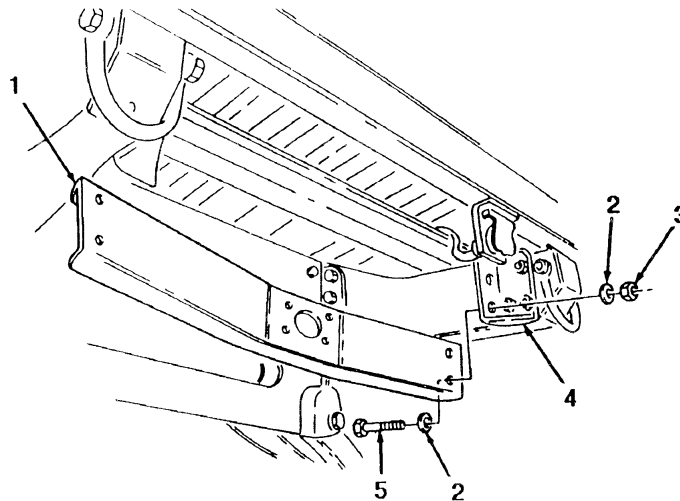


FIGURE 4-1

No Step Here!

The HMMWV's tow pintle looks like a handy step. Trouble is, it swivels in a complete circle. Your foot can slip off and—*ouch!*—you end up with a cracked shin, sprained ankle, or worse.

Play it safe.
Lower the
tailgate to
get in and
out of your
truck.



PS 528

Chapter 18

BODY, CAB AND HOOD ASSEMBLY

Functional
Group Code
1801-1812

MODEL:

HMMWV, M998 Series

SUBJECT:

"C" Pillar Reinforcement Brackets

POC:

Ms. Patricia Grashik, AMSTA-MTA, DSN 786-7427, Commercial (810) 574-7427
grashikp@cc.tacom.army.mil

DEFICIENCY:

Field reports indicate the "C" pillar mount brackets are cracking prematurely at wheelhousing.

COMMENTS:

Unit maintenance can fabricate two reinforcement brackets and affix them to front of "C" pillar and wheelhousing. Fabrication and installation of reinforcement brackets can be accomplished in the field by using the following parts and procedures:

MATERIALS/PARTS:

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
9535-00-541-7194	Sheet Metal	1
5305-00-993-2457	Screw	2
5310-00-081-4219	Washer	4
5310-00-483-8791	Nut	2
5320-01-034-1884	Rivet	8

PROCEDURE:

A. Fabricate Reinforcement Brackets.

1. Use NSN 9535-00-541-7194 sheet metal, cut two reinforcement brackets (1). (see figure 3-18)
 2. Locate, mark, and drill four 0.125-inch diameter holes in two reinforcement brackets (1).
 3. Bend left reinforcement bracket (1). (see figure 3-19)
 4. Bend right reinforcement bracket (1). (see figure 3-20)
-
-

B. Left Reinforcement Bracket Installation.

1. Loosen turnbuttons (3) on left "C" pillar (4) that secure top (1) and rear curtain (2). Remove top (1) and rear curtain (2) for accessibility to "C" pillar (4). (see figure 3-21)
2. Using a 0.187-inch drill, remove rivet (4) on left wheelhousing (3). (see figure 3-22)
3. Scribe two reference lines (2) on left "C" pillar (1).
4. Align reinforcement bracket (1) within reference lines (3) on left "C" pillar (2). (see figure 3-23)
5. Scribe hole (5) location on left wheelhousing (4) onto reinforcement bracket (1).
6. Using reinforcement bracket (2) as a template, drill four 0.187-inch diameter holes through reinforcement bracket (2) and left "C" pillar (1). (see figure 3-24) Remove reinforcement bracket (2).
7. Using a 0.281-inch drill, enlarge hole (5) in left wheelhousing (4). (see figure 3-23)
8. Using hole location marked in step 5, drill 0.281-inch diameter hole in reinforcement bracket (1).
9. Spot paint reinforcement bracket (1). (Refer to TM 43-0139.)
10. Position reinforcement bracket (2) to left "C" pillar (1) and secure with four NSN 5320-01-034-1884 rivets (3). (see figure 3-24)
11. Align mount holes (7) in reinforcement bracket (2) and left wheelhousing (5) and secure with NSN 5305-00-993-2457 screw (8), two NSN 5310-00-081-4219 washers (4), and NSN 5310-00-483-8791 nut (6).
12. Spot paint as necessary. (Refer to TM 43-0139.)
13. Install top (1) and rear curtain (2) on left "C" pillar (4) and secure with turnbuttons (3). (see figure 3-21)

C. Right Reinforcement Bracket Installation.

1. Loosen turnbuttons (3) on right "C" pillar (4) that secure top (1) and rear curtain (2). Remove top (1) and rear curtain (2) for accessibility to "C" pillar (4). (see figure 3-21)
 2. Using a 0.187-inch drill, remove rivet (4) on right wheelhousing (3). (see figure 3-22)
 3. Scribe two reference lines (2) on right "C" pillar (1).
 4. Align reinforcement bracket (1) within reference lines (3) on right "C" pillar (2). (see figure 3-23)
 5. Scribe hole (5) location on right wheelhousing (4) onto reinforcement bracket (1).
-
-

6. Using reinforcement bracket (2) as a template, drill four 0.187-inch diameter holes through reinforcement bracket (2) and right "C" pillar (1). (see figure 3-24) Remove reinforcement bracket (2).
7. Using 0.281-inch drill, enlarge hole (5) in right wheelhousing (4). (see figure 3-23)
8. Using hole location marked in step 5, drill 0.281-inch diameter hole in reinforcement bracket.
9. Spot paint reinforcement bracket (1). (Refer to TM 43-0139.)
10. Position reinforcement bracket (2) to right "C" pillar (1) and secure with four NSN 5320-01-034-1884 rivets (3). (see figure 3-24)
11. Align mount holes (7) in reinforcement bracket (2) and right wheelhousing (5) and secure with NSN 5305-00-993-2457 screw (8), two 5310-00-081-4219 washers (4), and NSN 5310-00-483-8791 nut (6).
12. Spot paint as necessary. (Refer to TM 43-0139.)
13. Install top (1) and rear curtain (2) on right "C" pillar (4) and secure with turnbuttons (3). (see figure 3-21)

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit

NOTE:
ALL DIMENSIONS ARE IN INCHES

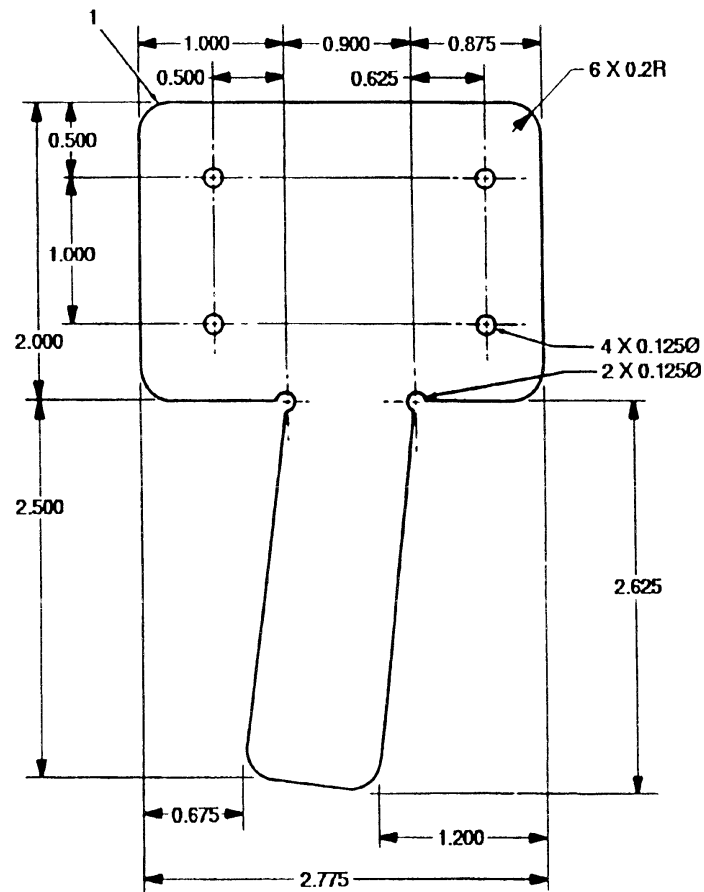


FIGURE 3-18

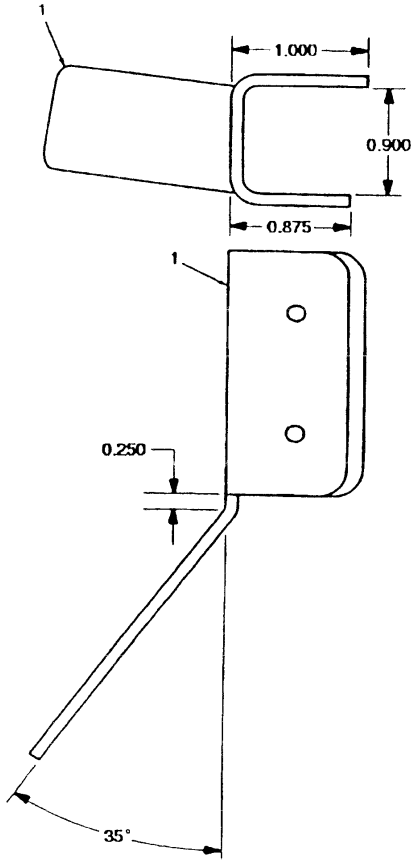


FIGURE 3-19

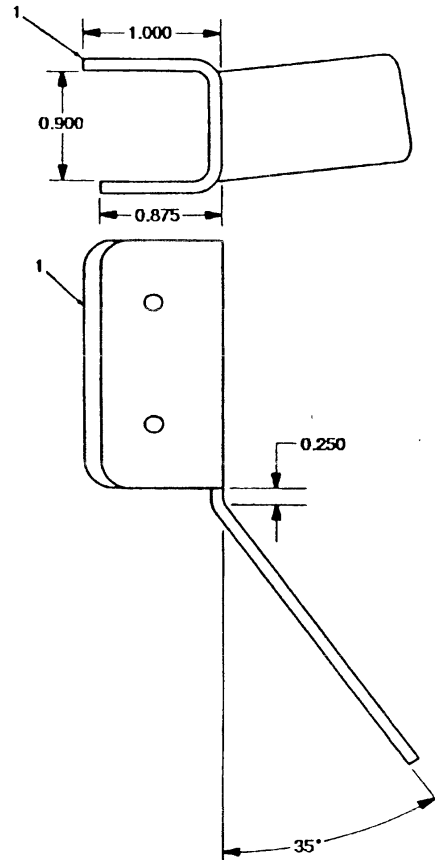
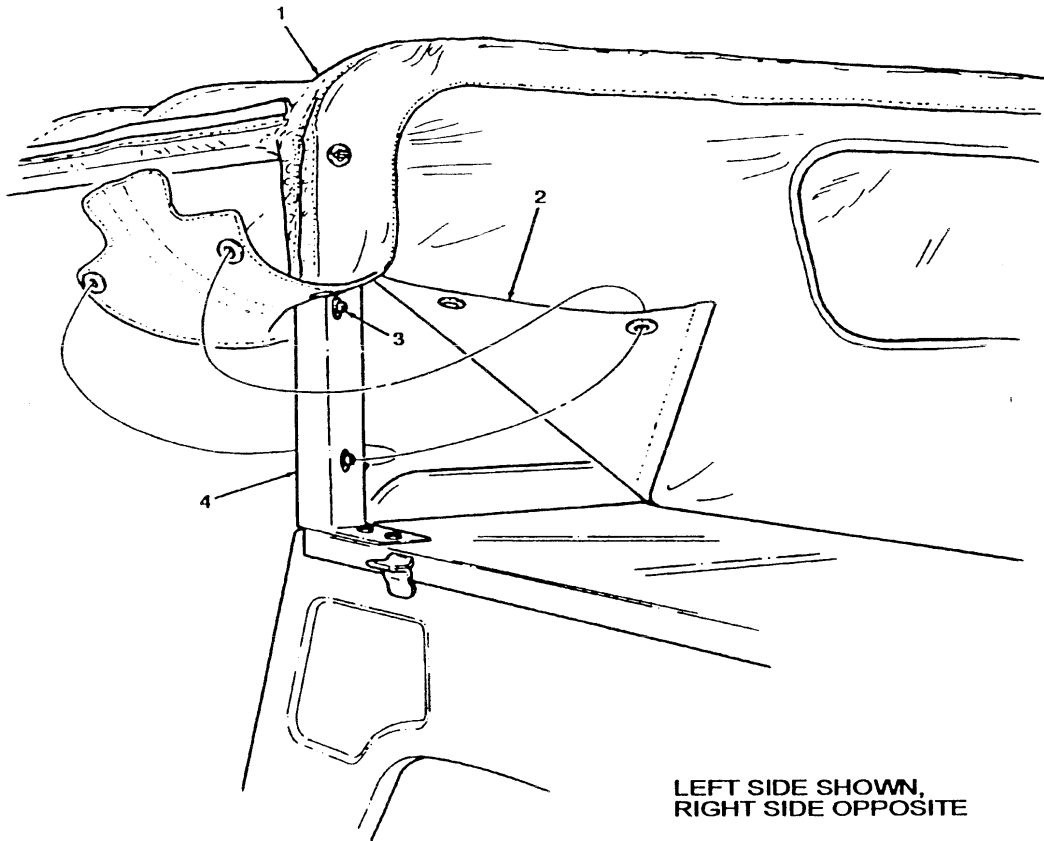


FIGURE 3-20



LEFT SIDE SHOWN,
RIGHT SIDE OPPOSITE

FIGURE 3-21

NOTE:
ALL DIMENSIONS ARE IN INCHES

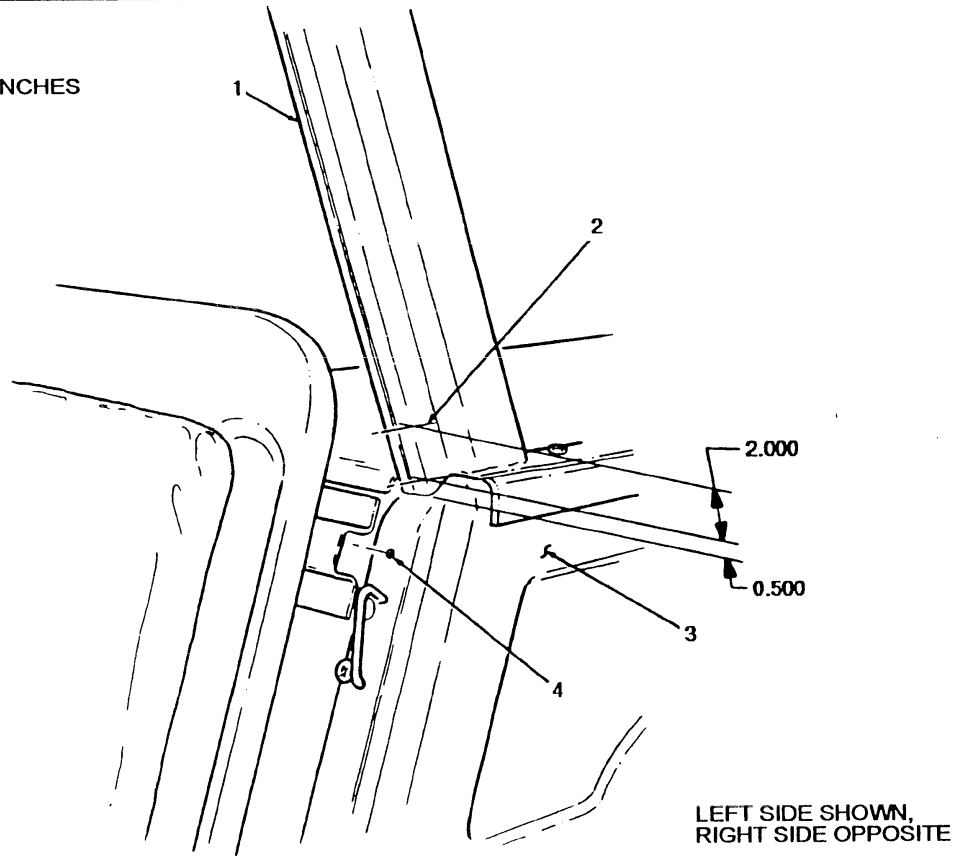


FIGURE 3-22

NOTE:
ALL DIMENSIONS ARE IN INCHES

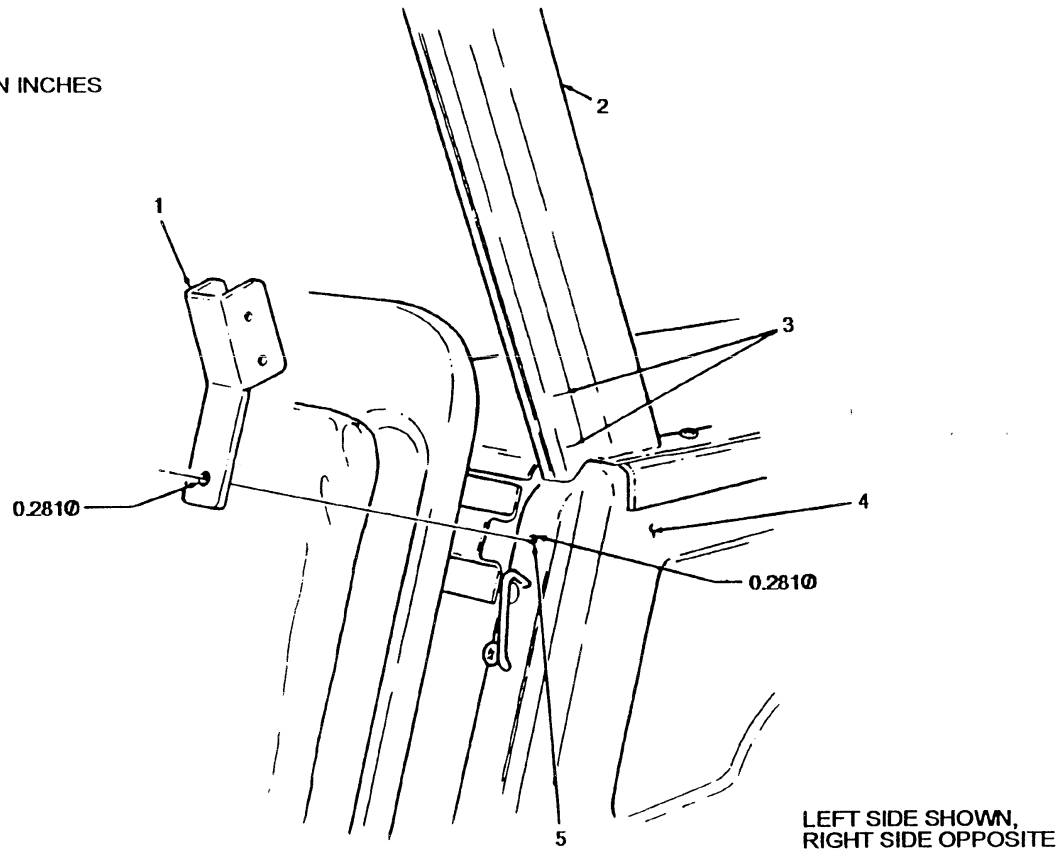


FIGURE 3-23

NOTE:
ALL DIMENSIONS ARE IN INCHES

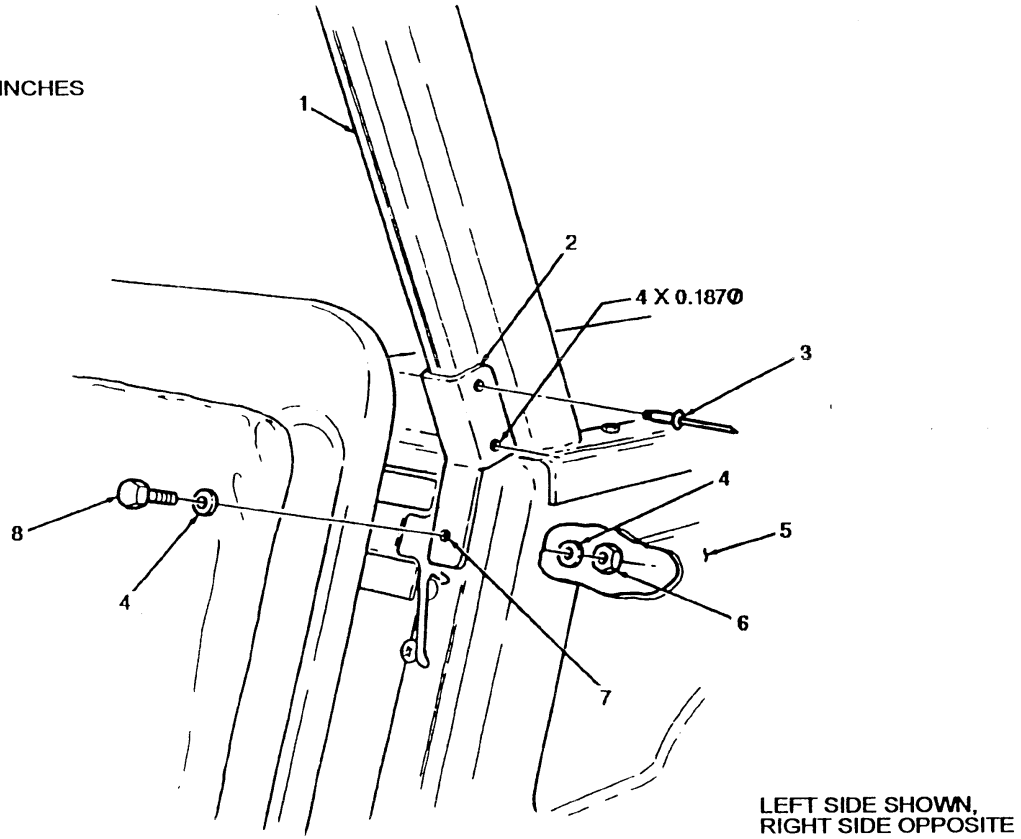


FIGURE 3-24

3-9. Tactical Trucks

MODEL:
HMMWV

SUBJECT:
Hood lifting procedures

POC:
Mr. Charles Colpean, AMSTA-IM-MTA, DSN 786-7346, Commercial (810) 574-7346
colpeanc@cc.tacom.army.mil

DEFICIENCY:
Current procedures leave out measures to prevent damage to equipment and injury to personnel.

COMMENTS:
The following will print in a future update to the Operators manual. Changes to the existing procedures are underlined below.

PROCEDURES:
3-8 RAISING AND SECURING HOOD

- a. Raising hood.
 - (1) Apply parking brake.
 - (2) Release left and right hood latches (1).

WARNING

To ensure opening of the hood assembly is accomplished safely, always maintain the proper lifting posture, legs bent with back straight. Failure to do so may cause injury.

NOTE

Due to the inherent weight of the assembly, the hood may flex when opening possibly causing interference between the right side of the hood assembly and the body. This interference can be eliminated by pushing the hood assembly away from the individual prior to lifting.

- (3) Facing the driver's side of the hood, position one hand at the rear area of the hood and the other at the rear area of the wheel well.

WARNING

When raising and securing the hood, make sure the hood prop rod is secured to hood support bracket. Damage to equipment or injury to personnel will occur if hood is not properly in raised position.

- (4) Push the hood toward the passenger side and lift at the same time, moving your hands toward the front of the hood as it opens. Ensure the prop rod (2) is securely positioned in the hood support bracket (3). The prop rod (2) should automatically engage in the support bracket (3) when hood is raised.

Lowering Hood.

WARNING

When releasing hood prop rod, do not pull rod at hook end. Injury to fingers will occur.

3-9. Tact. Trucks cont.

CAUTION

Lower hood slowly. Damage to hood and/or headlights can occur if hood is dropped.

- (1) While supporting and slightly raising the hood, grasp the prop rod (2) above retaining ring (5), pull out and release hood prop rod (2).
- (2) Once the prop rod hook (4) is clear of the support bracket (3) slowly lower hood and secure left and right hood latches (1).

PUBLICATIONS AFFECTED:

TM9-2320-280-10

LEVEL OF MAINTENANCE:

Operator

MODEL:

Tactical Vehicles

SUBJECT:

Hood Light

POC:

Ms. Katie Gorski, AMSTA-MTB, DSN 786-7426

DEFICIENCY:

Tactical vehicles were fielded without hood lights. When mechanics/operators perform maintenance at night, they must use flashlights.

COMMENTS:

A hood light can be mounted based on company commander's discretion. This is considered a minor alteration, since the vehicle could be returned to its original configuration within 24 hours.

NOTE: We also would like to provide some additional authorized lights:

a. National Stock Number (NSN) 6230-00-264-8261, flashlight, 90 percent head angle; w/blackout, red, clear and smoked lens. Also, has a clip for hanging – cost = \$3.96.

b. National Stock Number (NSN) 6340-00-498-9408, lantern, electric, hand, 6 volt – cost = \$18.84.

c. National Stock Number (NSN) 6230-00-2086-4296, extension light w/25 foot cord – cost = \$37.55.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Direct Support

18-13

3-12. Tactical Trucks

MODEL:

M998, M998A1, M1035, M1035A1, M1035A2, M1037, M1038, M1038A1, M1042, M1097, M1097A1, and M1097A2

SUBJECT:

Rubber Wellnut or Insert Replacement for A-Pillar and B-Pillar

POC:

Ms. Jody McInerney, AMSTA-IM-HLA, DSN 786-5481, Commercial (810) 574-5481
mcinernj@cc.tacom.army.mil

COMMENTS:

Procedures have been developed to replace rubber wellnuts or inserts with larger inserts. These corrective actions can be accomplished in the field by using the following parts.

MATERIALS/PARTS:

NSN	NOMENCLATURE	QTY
← (5305-00-016-0541)	Screw	1
5310-01-411-3422	Insert	1

PROCEDURES:

1. Remove two man or four man soft top (refer to TM9-2320-280-10).
2. Remove two man or four man horizontal rails (refer to TM9-2320-280-10).
3. If replacing a wellnut (NSN 5310-00-755-7283) or insert (NSN 5310-01-413-3276), remove wellnut or insert from A-pillar or B-pillar (refer to TM9-2320-280-20).
4. Enlarge hole in A-pillar (1) or B-pillar (2) to 0.391-inch diameter. (see figure 3-15)
5. Enlarge hole in horizontal rail (3) to 0.281-inch diameter.
6. Install NSN 5310-01-411-3422 insert in A-pillar or B-pillar (refer to TM9-2320-280-20).
7. Install NSN 5305-00-016-0541 screw to horizontal rail and A-pillar or B-pillar (refer to TM9-2320-280-10).
8. Install two man or four man soft top (refer to TM9-2320-280-10).

PUBLICATIONS AFFECTED:

None

671 PN ← No ins
1605-11

3-12. Tact. Trucks cont.

LEVEL OF MAINTENANCE:
Unit

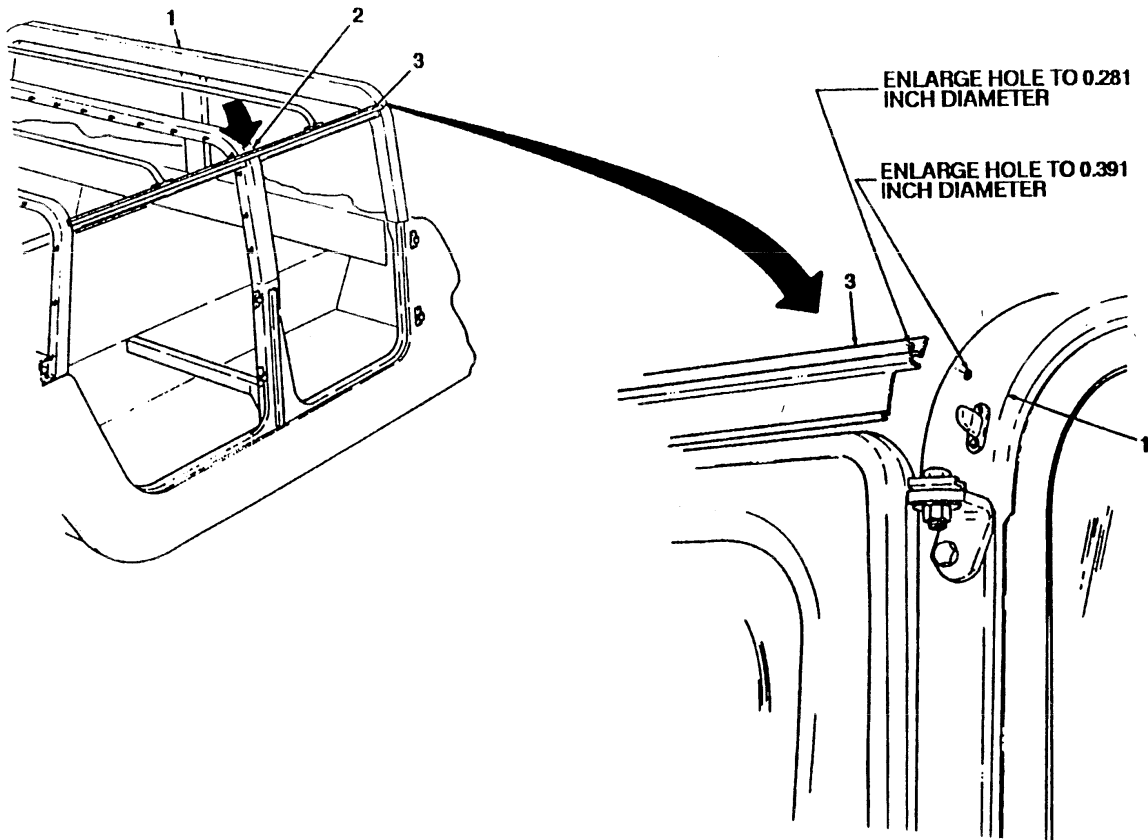


FIGURE 3-15

4-4. Tactical Trucks

MODEL:

HMMWV's with Ballistic Glass

SUBJECT:

Ballistic Glass

POC:

Ms. Jody McInerney, AMSTA-IM-MTA, DSN 786-7346, Commercial (810) 574-7346
mcinernj@cc.tacom.army.mil

COMMENTS:

A. The ballistic glass is extremely sensitive to attack/degradation when contacted by hydrocarbonic chemical compounds, such as paints or evaporative-type products. Some other products that shouldn't come in contact with the window are loctite, grease, lubricants, strong cleaning solvents, gasoline, kerosene, and benzene. Be careful about what products you put on and spray around your ballistic glass.

B. When cleaning the ballistic glass be sure to follow TM9-2320-280-10, w/change 5, Feb 94, page 2-59, Table 2-1 General Cleaning Instructions. The ballistic glass calls for detergent, soapy water, plastic polish, and dry rags.

PUBLICATIONS AFFECTED:

TM9-2320-280-10

LEVEL OF MAINTENANCE:

Operator

8-3. Tact. Trucks cont.

PUBLICATIONS AFFECTED:

TM9-2320-280-20-1

LEVEL OF MAINTENANCE:

Unit

8-4. Tactical Trucks

MODEL:

Tactical Vehicles

SUBJECT:

Prevent Ice and Snow from Accumulating on Windshields

POC:

Mr. Eric Sutman, AMSTA-MTA, DSN 786-7151, Commercial (810) 574-7151

DEFICIENCY:

In the winter, ice and snow build up on the windshields of tactical vehicles. Operators can spend a lot of time scraping ice from the windshields.

COMMENTS:

A. FM 21-305, Manual for the Wheeled Vehicle Driver, states, "Windshields of vehicles parked in open lots may be covered with cardboard or canvas to prevent overnight frosting."

B. We received a SMART initiative recommending vehicle operators use an MRE box sleeve to keep ice and snow off the windshields of tactical vehicles. After you've parked your vehicle at the end of the day, cut an MRE box sleeve in half and place the halves under the wiper blades. After a snow or freezing rain all you have to do is remove the box sleeve halves and you have a clear windshield. Although MRE box sleeves work well, any suitably sized piece of cardboard or canvas should do the job.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Operator

MODEL:

HMMWV, M998 and M998A1 Series, 1-1/4 Ton, 4x4

SUBJECT:

Damaged floor drain replacement procedure

POC:

Ms. Patricia Grashik, AMSTA-IM-MTA, DSN 786-7713, Commercial (810) 574-7713
grashikp@cc.tacom.army.mil

3-10. Tact. Trucks cont.

EDITOR'S NOTE:

This is a reprint of the same article that was published in TB 43-0001-39-4, dated 5 Mar 95.

- plate, drain hole PN has been changed.
- fabrication drawing has been added.

COMMENTS:

Maintenance procedures have been developed to replace a damaged floor drain with a replacement drain hole plate. Installation of drain hole plate can be accomplished in the field by using the following parts and procedures:

MATERIALS/PARTS:

Parts to be Requisitioned:

<u>NSN OR P/N</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
(19207) 57K3212 *	Plate, Drain hole	1
8030-01-347-0964	Sealant, Adhesive	1
	Gray, Uniroyal	
5320-01-271-6357	Rivet	7
5320-01-264-5978	Rivet	3

* The plate won't be available through the supply system for 12-18 months. In the interim, it can be fabricated per drawing. (see figure 3-9)

REFERENCE:

For body repair and maintenance, refer to TM9-2320-280-20.

PROCEDURE:

A. Floor Drain Damage.

Identify damaged drain hole (A, B, or C) location and repair method (I, II, or III). (see figure 3-10)

B. Floor Drain Repair Method I.

(1) Mark an outline (1) at drain hole (2) on floor panel (3). (see figure 3-11)

3-10. Tact. Trucks cont.

- (2) Cut and remove drain hole (2) material from floor panel (3), marked in step 1. Remove sharp edges and burrs from floor panel (3). (see figure 3-11)
- (3) Mark underside of floor panel (1) with two lines (3) centered over damaged floor drain area. (see figure 3-12)

NOTE

It may be necessary to bend or shape the drain hole plate to the contour of floor panel.

When installed, the drain hole plate opening faces toward the rear of vehicle.

- (4) Position P/N 12447129 drain hole plate (4) to the underside of floor panel (1). Bend or shape drain hole plate (4) to the contour of floor panel (1). (see figure 3-12)
- (5) Using drain hole plate (4) as a template, transfer seven hole locations (5) onto floor panel (1). Remove drain hole plate (4).
- (6) Using hole locations (5) marked in step 5., drill seven 0.187-inch diameter holes through underside of floor panel (1).
- (7) Enlarge seven template holes (5) to 0.187-inch diameter in drain hole plate (4).
- (8) Apply approximately 0.125-inch thickness of P/N 89616 Silaprene adhesive sealant to shaded mating surface on drain hole plate (4).
- (9) Apply approximately 0.125-inch thickness of P/N 89616 Silaprene adhesive sealant to shaded mating surface on underside of floor panel (1).
- (10) Position drain hole plate (4) to underside of floor panel (1).
- (11) Install seven NSN 5320-01-271-6357 rivets (2) through floor panel (1) and drain hole plate (4).
- (12) Remove adhesive residue and clean edges on floor panel (1) and drain hole plate (4).
- (13) Spot paint floor panel (1) and drain hole plate (4). (Refer to TM 43-0139.)

C. Floor Drain Repair Method II.

- (1) Mark an outline (1) at drain hole (2) on floor panel (3). (see figure 3-13)
- (2) Cut and remove drain hole (2) material from floor panel (3), marked in step 1. Remove sharp edges and burrs from floor panel (3).
- (3) Mark underside of floor panel (1) with two lines (3) centered over damaged floor drain area. (see figure 3-14)

3-10. Tact. Trucks cont.

NOTE

When installed, the drain hole plate opening faces toward the rear of vehicle.

- (4) Position P/N 12447129 drain hole plate (4) to the underside of floor panel (1). (see figure 3-14)
- (5) Using drain hole plate (4) as a template, transfer seven hole locations (5) onto floor panel (1). Remove drain hole plate (4).
- (6) Using hole locations (5), marked in step 5., drill seven 0.187-inch diameter holes through underside of floor panel (1).
- (7) Enlarge seven template holes (5) to 0.187-inch diameter in drain hole plate (4).
- (8) Apply approximately 0.125-inch thickness of P/N 89616 Silaprene adhesive sealant to shaded mating surface on drain hole plate (4).
- (9) Apply approximately 0.125-inch thickness of P/N 89616 Silaprene adhesive sealant to shaded mating surface on underside of floor panel (1).
- (10) Position drain hole plate (4) to underside of floor panel (1).
- (11) Install seven NSN 5320-01-271-6357 rivets (2) through floor panel (1) and drain hole plate (4).
- (12) Remove adhesive residue and clean edges on floor panel (1) and drain hole plate (4).
- (13) Spot paint floor panel (1) and drain hole plate (4). (Refer to TM 43-0139.)

D. Floor Drain Repair Method III.

- (1) Mark an outline (1) at drain hole (2) on floor panel (5). (see figure 3-15)
- (2) Cut and remove drain hole (2) material from floor panel (5), marked in step 1. Remove sharp edges and burrs from floor panel (5).
- (3) Mark underside of floor panel (1) with two lines (3) centered over damaged floor drain. (see figure 3-16)
- (4) Using a 0.187-inch diameter drill remove rivet (3) that secures floor panel (5) and side body panel (4). (see figure 3-15)

NOTE

It may be necessary to bend or shape the drain hole plate to the contour of floor panel.

When installed, the drain hole plate opening faces toward the driveshaft.

3-10. Tact. Trucks cont.

- (5) Position P/N 12447129 drain hole plate (4) to the underside of floor panel (1) and side body panel (6). Bend or shape drain hole plate (4) to the contour of floor panel (1) and side body panel (6). (see figure 3-16)
- (6) Using drain hole plate (4) as a template, transfer seven hole locations (5) onto floor panel (1) and side body panel (6). Remove drain hole plate (4).
- (7) Using hole locations marked in step 6., drill seven 0.187-inch diameter holes through underside of floor panel (1) and side body panel (6).
- (8) Enlarge seven template holes (5) to 0.187-inch diameter in drain hole plate (4).
- (9) Apply approximately 0.125-inch thickness of P/N 89616 Silaprene adhesive sealant to shaded mating surfaces on drain hole plate (4).
- (10) Apply approximately 0.125-inch thickness of P/N 89616 Silaprene adhesive sealant to shaded mating surfaces on underside of floor panel (1) and side body panel (6).
- (11) Position drain hole plate (4) to underside of floor panel (1) and side body panel (6).
- (12) Install five NSN 5320-01-271-6357 rivets (2) through floor panel (1) and drain hole plate (4).
- (13) Using rivet hole drilled in step 4., as a template, drill a 0.187-inch diameter hole (7) through drain hole plate (4).
- (14) Install three NSN 5320-01-264-5978 rivets (2) through floor panel (1), side body panel (4), and drain hole plate (3). (see figure 3-17)
- (15) Remove adhesive residue and clean edges on floor panel (1), side body panel (4), and drain hole plate (3).
- (16) Spot paint floor panel (1), side body panel (4), and drain hole plate (3). (Refer to TM 43-0139.)

PUBLICATIONS AFFECTED:

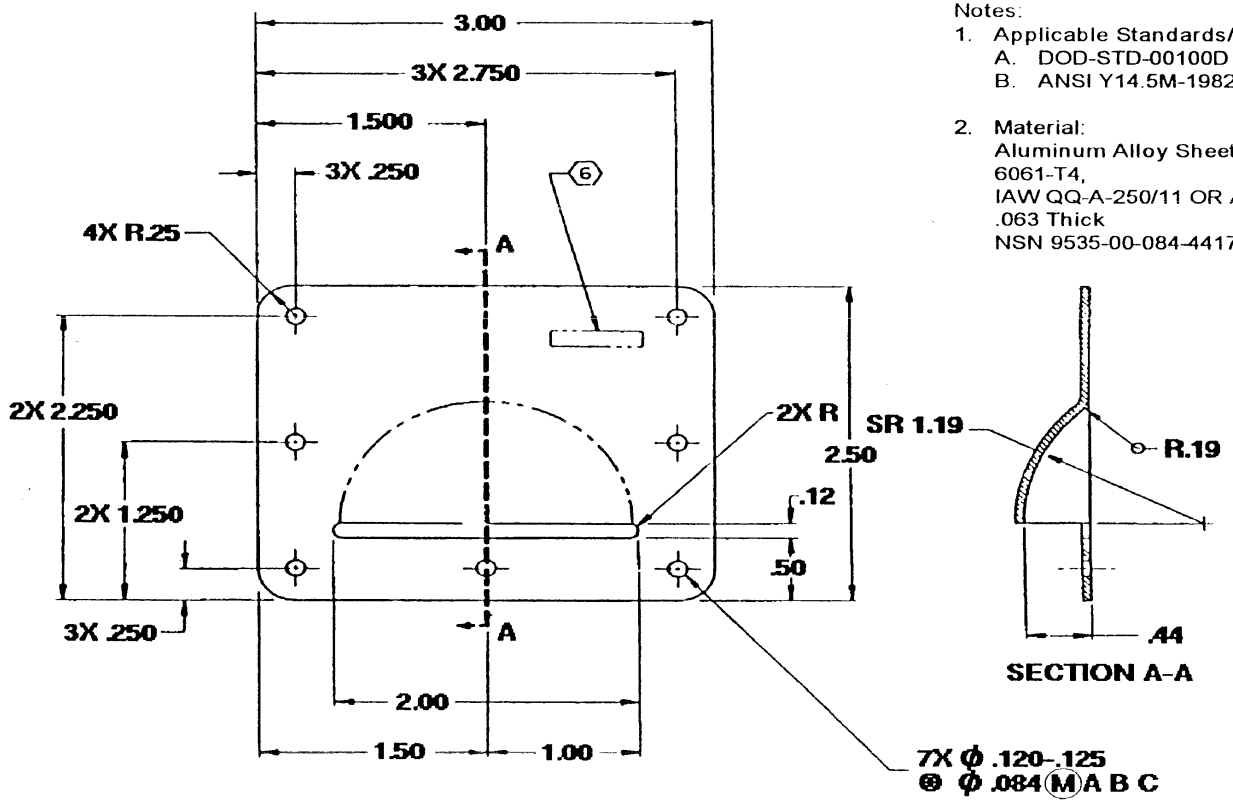
TM9-2320-280-20

TM9-2320-280-20P

TM9-2320-280-34P

LEVEL OF MAINTENANCE:

Unit

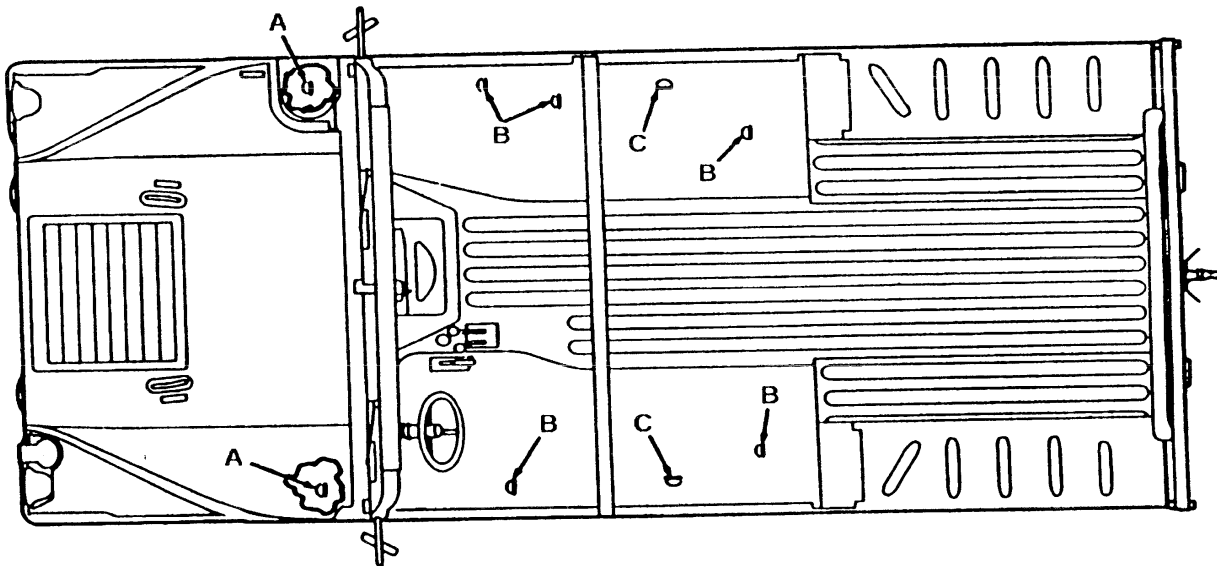


Notes:

1. Applicable Standards/Specifications:
 - A. DOD-STD-00100D (AR)
 - B. ANSI Y14.5M-1982
2. Material:

Aluminum Alloy Sheet,
6061-T4,
IAW QQ-A-250/11 OR ASTM B209
.063 Thick
NSN 9535-00-084-4417

FIGURE 3-9



- A. METHOD I
- B. METHOD II
- C. METHOD III

FIGURE 3-10

NOTE: ALL DIMENSIONS ARE IN INCHES.

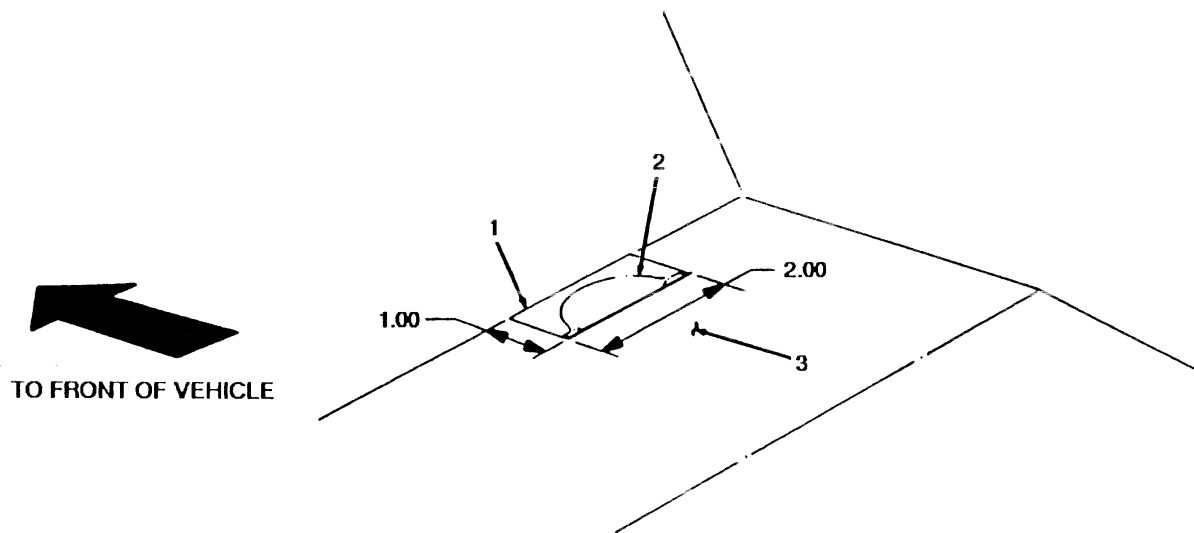


FIGURE 3-11

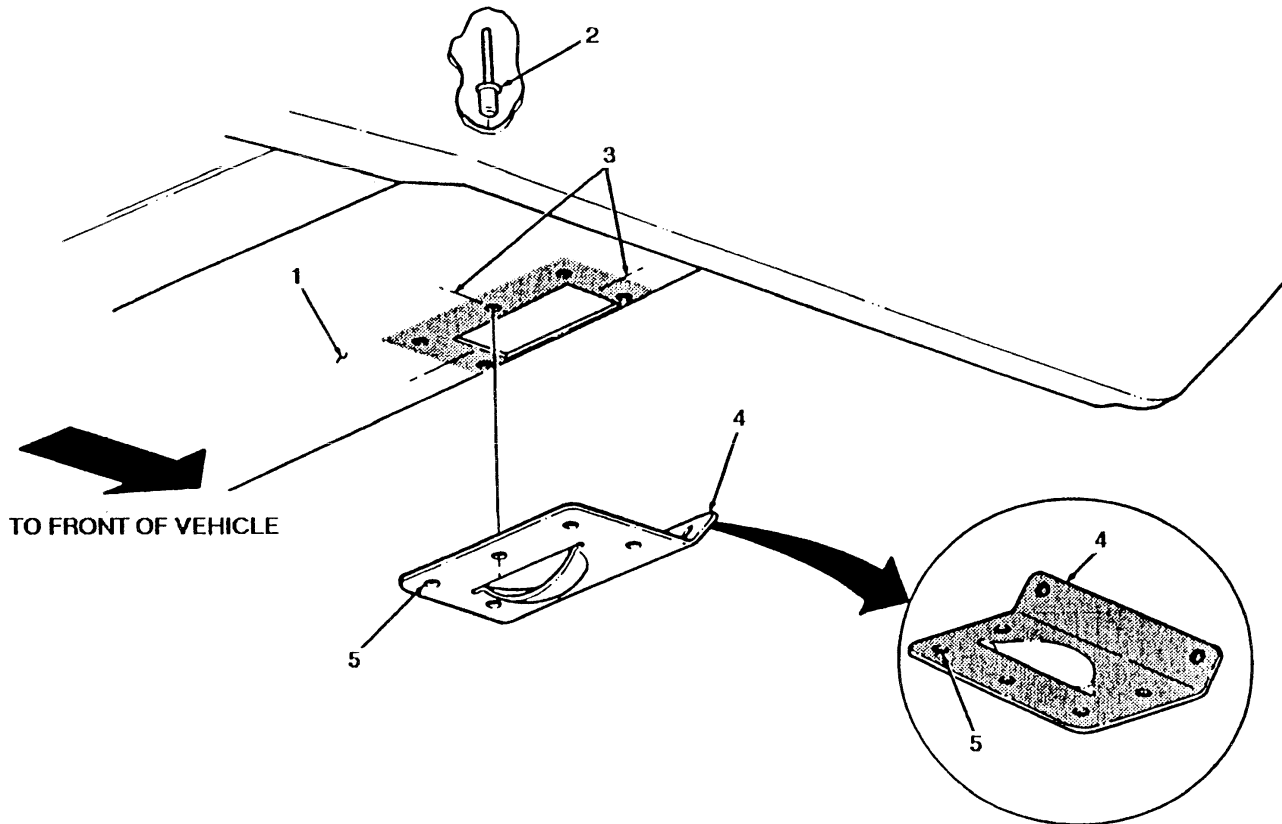


FIGURE 3-12

NOTE: ALL DIMENSIONS ARE IN INCHES.

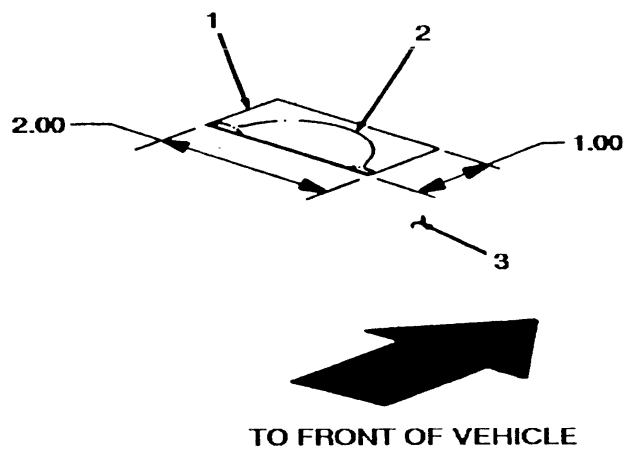


FIGURE 3-13

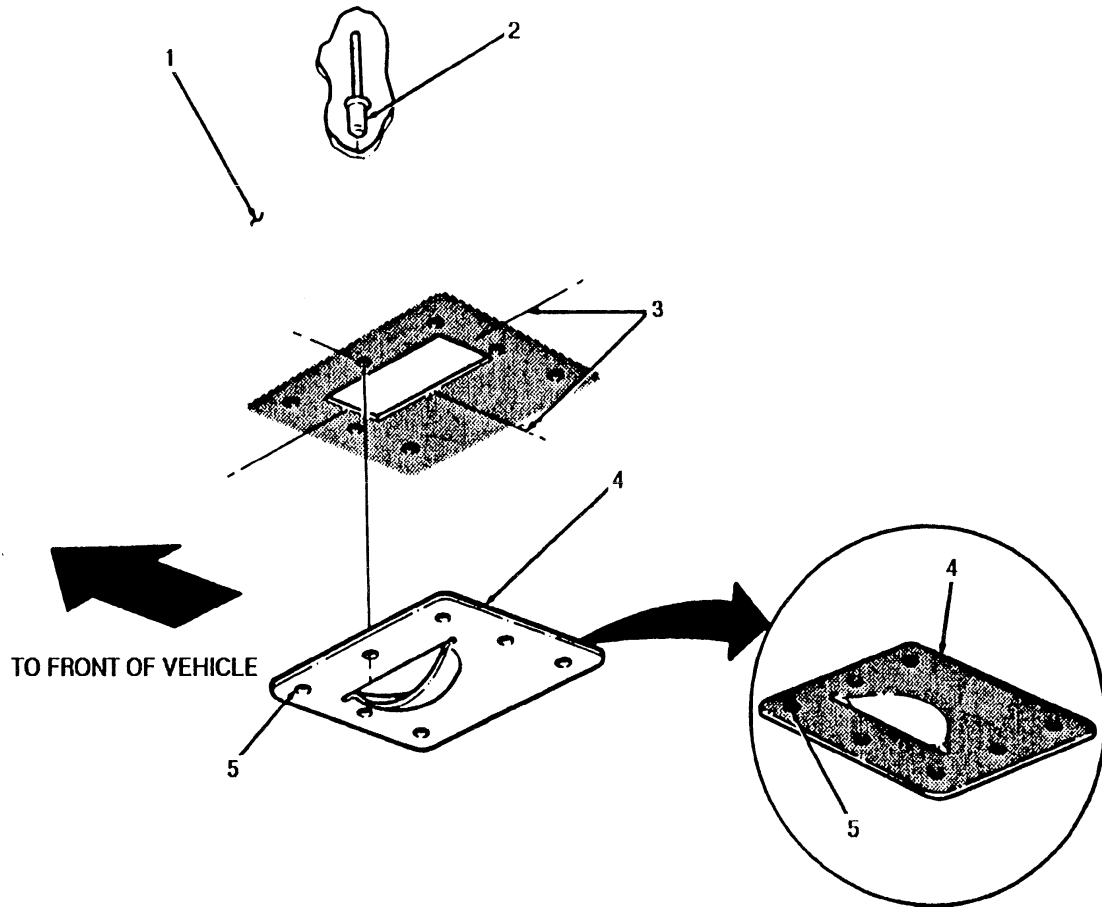


FIGURE 3-14

NOTE: ALL DIMENSIONS ARE IN INCHES.

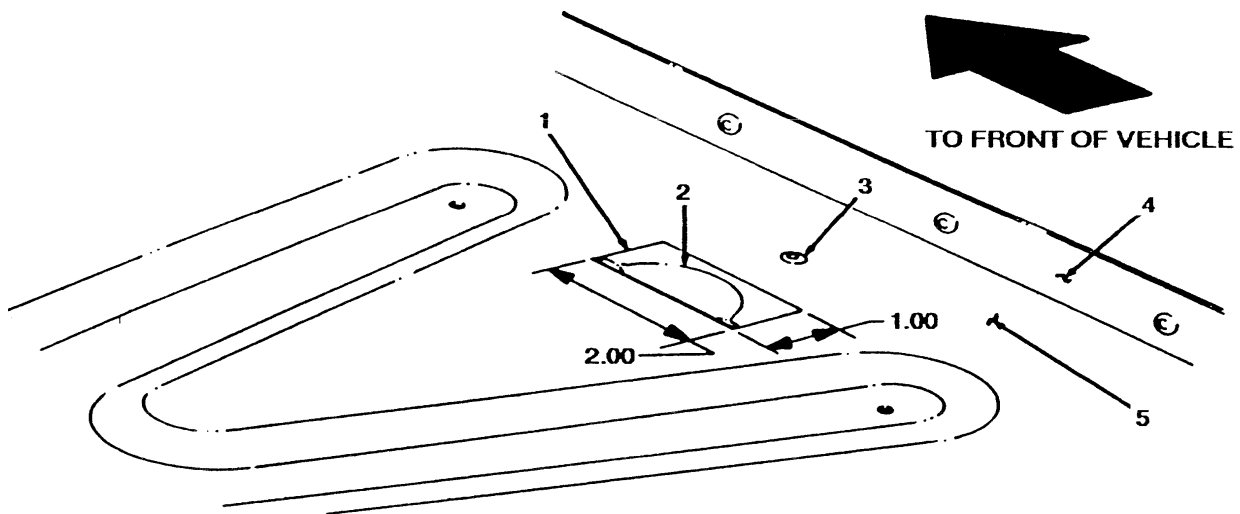


FIGURE 3-15

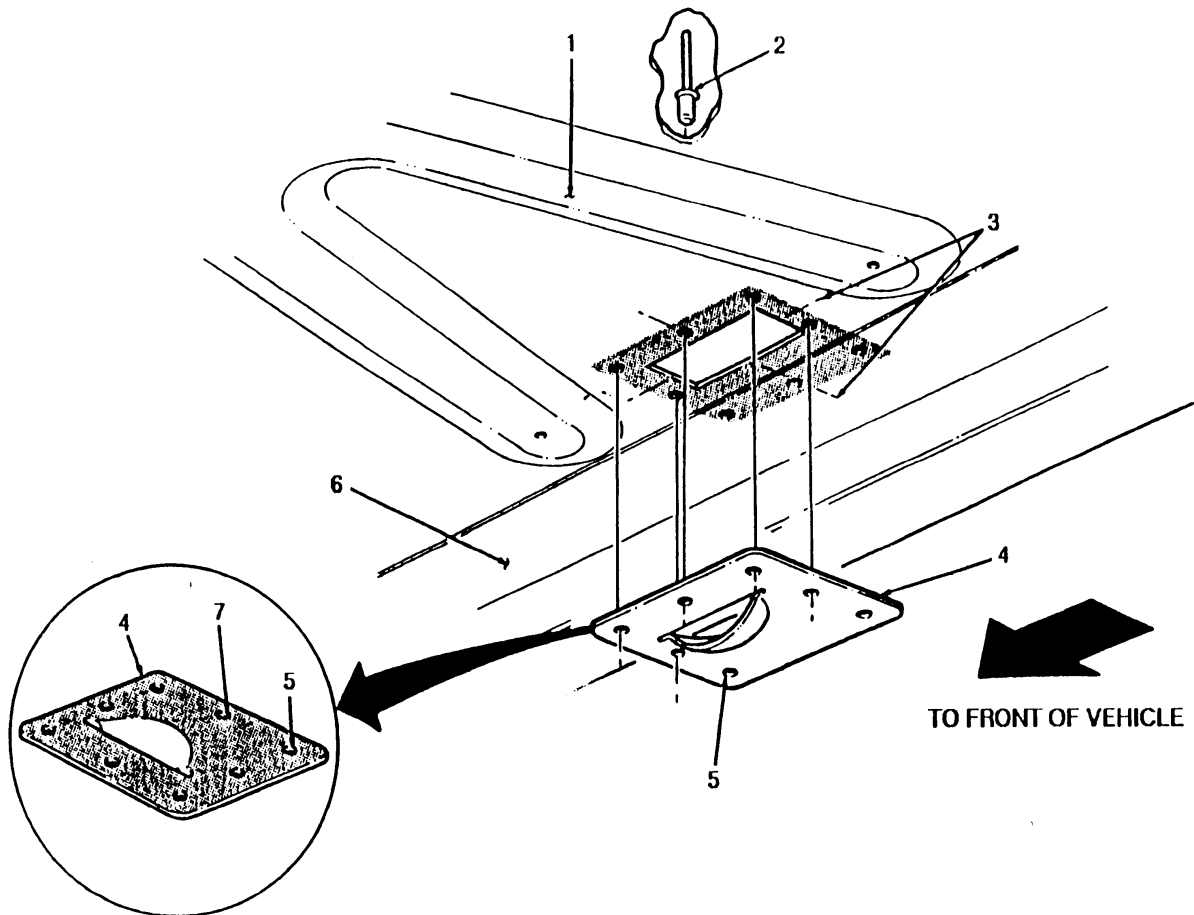


FIGURE 3-16

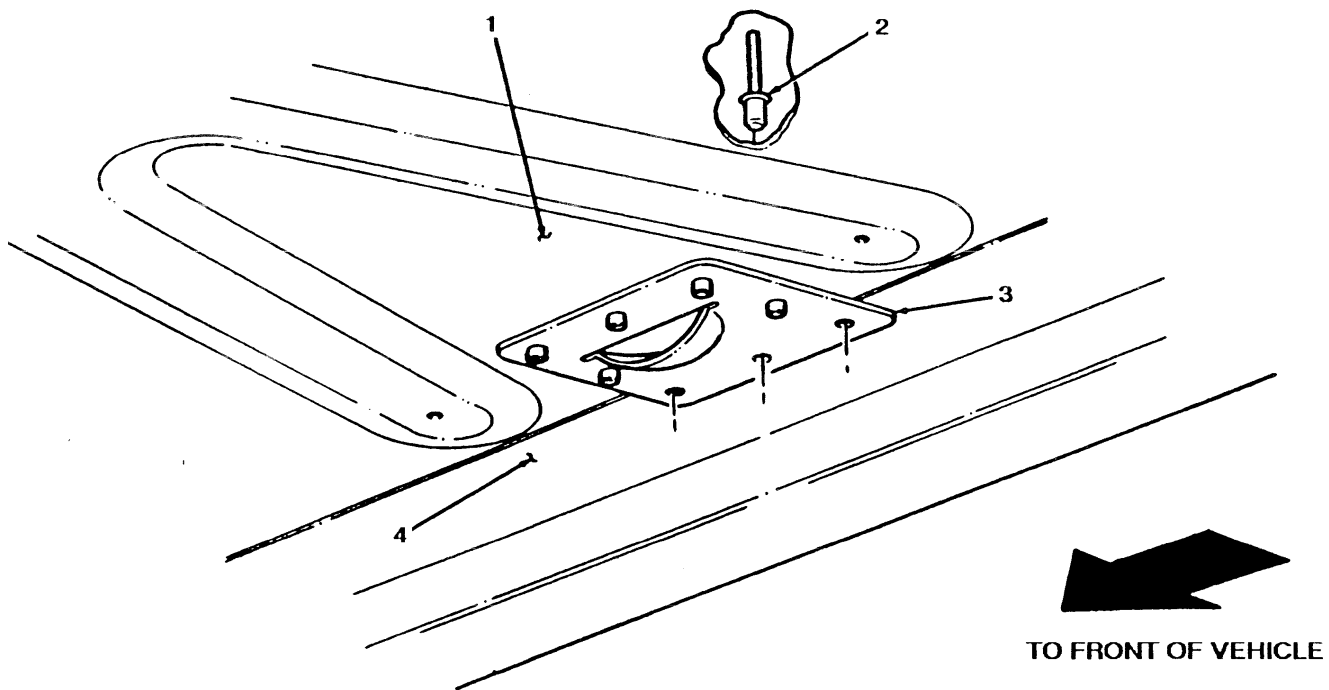


FIGURE 3-17

3-14. Tactical Trucks

MODEL:
M998 Series HMMWV

SUBJECT:
Floor Repair

POC:
Mr. Daniel Dudek, AMSTA-IM-MTA, DSN 786-7416, Commercial (810) 574-7416
dudekd@cc.tacom.army.mil

COMMENTS:
The HMMWV series of Technical Manuals (TMs) do not contain adequate information for repair to the floor in the passenger compartment area. We've developed procedures (approx. 97 pages) for repair of the floor panels. The procedures are written so that each section of floor (right front, left front, right rear, left rear) can be repaired independent of each other. The procedures are scheduled to be included in a future change to the TM. However, due to the status of the current revision, they could not be included. To obtain an advance copy of the Floor Repair procedures, contact the POC listed above or write to:

Commander
US Army Tank-automotive and Armaments Command
ATTN: AMSTA-IM-MTA (HMMWV)
Warren, MI. 48397-5000

PUBLICATIONS AFFECTED:

TM9-2320-280-34
TM9-2320-280-34P
TM9-2320-387-24-2
TM9-2320-387-24P

LEVEL OF MAINTENANCE:
Unit

3-13. Tactical Trucks

MODEL:
HMMWV, M998 Series

SUBJECT:
Left Front Floor Panel Repair

POC:
Mr. Daniel Dudek, AMSTA-MTA, DSN 786-7416, Commercial (810) 574-7416
dudekd@cc.tacom.army.mil

DEFICIENCY:
Units lack technical manual maintenance support for replacing a damaged left floor panel on M998 series vehicles.

COMMENTS:
Removal and installation maintenance procedures have been developed for replacing the left front panel section when damaged. These procedures can be accomplished in the field by using the following materials, replacement parts, and instructions.

MATERIALS:

<u>NSN or P/N</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
8040-01-154-0031	Depends No-Mix Adhesive	1
(89616) Silaprene	Sealant, Adhesive, Gray, Uniroyal	1
9535-00-541-7194	Sheet Metal	1
5320-01-271-6357	Rivet	80
5320-01-264-5978	Rivet	25

REFERENCES:
For body repair maintenance, refer to TM9-2320-280-20.
For M998 series body maintenance, refer to TM9-2320-280-20.

3-13. Tact. Trucks cont.

PROCEDURE:

A. Vehicle Preparation.

1. Remove flashlight, if installed. (Refer to TM9-2320-280-10.)
2. Remove first aid kit, if installed. (Refer to TM9-2320-280-10.)
3. Remove pamphlet bag, if installed. (Refer to TM9-2320-280-10.)
4. Remove tow chain, if installed. (Refer to TM9-2320-280-10.)
5. Remove tool bag, if installed. (Refer to TM9-2320-280-10.)
6. Remove tire chains, if installed. (Refer to TM9-2320-280-10.)
7. Remove fire extinguisher, if installed. (Refer to TM9-2320-280-10.)
8. Remove fire extinguisher mount bracket. (Refer to TM9-2320-280-20.)
9. Remove driver's seat assembly. (Refer to TM9-2320-280-20.)
10. Remove front and rear seat support panels. (Refer to TM9-2320-280-20.)
11. Remove left floor insulation. (Refer to TM9-2320-280-20.)

B. Fabricate Insert Panel.

1. Using NSN 9535-00-541-7194 sheet metal, cut insert panel (1). (see figure 3-25)
2. Mark four reference lines (2) and directional arrow (3) on insert panel (1).
3. Place insert panel (1) on a suitable work surface with the arrow (2) facing up and toward left. (see figure 3-26)
4. Locate, mark, and drill six 0.218-inch diameter holes in insert panel.
5. Fabricate drain hole (3) in insert panel (1).
6. Cut and remove 0.18-inch of material from insert panel (1).
7. Remove all burrs and round all sharp edges on insert panel (1).

C. Fabricate Metal Strips.

1. Using NSN 9535-00-541-7194 sheet metal, cut metal strip (2). (see figure 3-27)
2. Mark two reference lines (1), a center line (3), directional arrow (4), and numeral "I" on metal strip (2).
3. Place metal strip "I" (1) on a suitable work surface with the arrow (2) facing up and left. (see figure 3-28)
4. Locate, mark, and drill twenty-three 0.187-inch diameter holes in metal strip "I" (1).
5. Using NSN 9535-00-541-7194 sheet metal, cut metal strip (2). (see figure 3-29)

3-13. Tact. Trucks cont.

6. Mark two reference lines (1), a center line (3), directional arrow (4), and the numeral "II" on metal strip (2). (see figure 3-29)
7. Place metal strip "II" (1) on a suitable work surface with the arrow (2) facing up and left. (see figure 3-30)
8. Locate, mark, and drill twenty-six 0.187-inch diameter holes in metal strip "II" (1).
9. Using NSN 9535-00-541-7194 sheet metal, cut two metal strips (1). (see figures 3-31 and 3-33)
10. Mark a center line (3), directional arrow (2), and numerals "III" or "IV" on each of the metal strips (1) cut in step 9.
11. Place metal strip "III" (1) on a suitable work surface with the arrow facing up and left. (see figure 3-32)
12. Locate, mark, and drill seven 0.187-inch diameter holes in metal strip "III" (1).
13. Place metal strip "IV" (1) on a suitable work surface with the arrow (2) facing up and left. (see figure 3-34)
14. Locate, mark, and drill fourteen 0.187-inch diameter holes in metal strip "IV" (1).

D. Left Front Floor Panel Removal Procedure.

1. Using a 0.187-inch drill, remove twenty-four rivets (3) that secure left front seat support (2) to left front floor panel (1). (see figure 3-35)
2. Position insert panel (2), with the arrow facing down and toward front of vehicle, to underside of left front floor panel (1) and align mount holes (3). (see figure 3-36)
3. Using insert panel (2) as a template, scribe an outline onto left front floor panel (1). Remove insert panel (2).

NOTE

Do not cut through front seat support when removing left front floor panel section scribed in step 3.

4. Using scribed outline marked in step 3 as a guide, cut and remove floor panel (1) section. (see figure 3-36)
5. Remove sharp edges and burrs within scribed outline on left front floor panel (1). (see figure 3-37)
6. Remove adhesive residue and clean left front seat support (2).
7. Position insert panel (2), with the arrow facing down and toward front of vehicle, to underside of left front floor panel (1). (see figure 3-38)

3-13. Tact. Trucks cont.

8. Obtain a minimum clearance of 0.10-inch between edges of insert panel (2) and left front floor panel (1). (see figure 3-38)
9. If a minimum 0.10-inch clearance is obtained between edges of insert panel (2) and left front floor panel (1), proceed to step 11.
10. Repeat steps 7 and 8, if minimum clearance of 0.10-inch clearance is not obtained between insert panel (2) and left front floor panel (1).
11. Remove insert panel (2).

E. Metal Strip "I" and Insert Panel Assembly Procedure.

1. Place insert panel (1) on a suitable work surface with the arrow facing up and left. (see figure 3-39)
2. Position metal strip "I" (2), with the arrow facing up and toward left, onto insert panel (1). Align reference lines (3).
3. Using metal strip "I" (2) as a template, locate, mark, and drill thirteen 0.187-inch diameter holes in insert panel (1). Remove metal strip "I" (2).
4. Apply approximately 0.125-inch thickness of P/N 89616 Silaprene adhesive sealant to shaded mating surfaces on insert panel (1) and metal strip "I" (2). (see figure 3-40)
5. Position metal strip "I" (2) to insert panel (1) and secure with thirteen NSN 5320-01-271-6357 rivets (3). (see figure 3-41)
6. Remove adhesive residue and clean edges on metal strip "I" (2) and insert panel (1).

F. Metal Strip "III" and Insert Panel Assembly Procedure.

1. Place insert panel (2) on a suitable work surface with the arrow facing up and toward left hand. (see figure 3-42)
2. Position metal strip "III" (1), with arrow facing up and toward metal strip "I" (4), onto insert panel (2). Align reference lines (3).
3. Using metal strip "III" (1) as a template, locate, mark, and drill seven 0.187-inch diameter holes in insert panel (2). Remove metal strip "III" (1).
4. Apply approximately 0.125-inch thickness of P/N 89616 Silaprene adhesive sealant to shaded mating surfaces on insert panel (2) and metal strip "III" (1). (see figure 3-43)
5. Position metal strip "III" (1) to insert panel (2) and secure with seven NSN 5320-01-271-6357 rivets (3). (see figure 3-44)
6. Remove adhesive residue and clean edges on metal strip "III" (1) and insert panel (2).

3-13. Tact. Trucks cont.

G. Metal Strip "IV" and Insert Panel Assembly Procedure.

1. Place insert panel (1) on a suitable work surface with the arrow facing up and toward left hand. (see figure 3-45)
2. Position metal strip "IV" (2), with arrow facing up and toward metal strip "I" (4), onto insert panel (1). Align reference lines (3).
3. Using metal strip "IV" (2) as a template, locate, mark, and drill seven 0.187-inch diameter holes in insert panel (1). Remove metal strip "IV" (2).
4. Apply approximately 0.125-inch thickness of P/N 89616 Silaprene adhesive sealant to shaded mating surfaces on insert panel (1) and metal strip "IV" (2). (see figure 3-46)
5. Position metal strip "IV" (2) to insert panel (1) and secure with seven NSN 5320-01-271-6357 rivets (3). (see figure 3-47)
6. Remove adhesive residue and clean edges on metal strip "IV" (2) and insert panel (1).

H. Metal Strip "II" and Insert Panel Assembly Procedure.

1. Place insert panel (3) on a suitable work surface with the arrow facing up and toward left hand. (see figure 3-48)
2. Position metal strip "II" (1), with arrow facing up and toward metal strip "III" (4), onto insert panel (3). Align reference lines (2).
3. Using metal strip "II" (1) as a template, locate, mark, and drill twelve 0.187-inch diameter holes in insert panel (3). Remove metal strip "II" (1).
4. Apply approximately 0.125-inch thickness of P/N 89616 Silaprene adhesive sealant to shaded mating surfaces on insert panel (2) and metal strip "II" (1). (see figure 3-49)
5. Position metal strip "II" (1) to insert panel (2) and secure with twelve NSN 5320-01-271-6357 rivets (3). (see figure 3-50)
6. Remove adhesive residue and clean edges on metal strip "II" (1) and insert panel (2).

I. Left Front and Insert Panel Drill Procedure.

1. Locate, mark, and drill eleven 0.187-inch diameter holes in left front floor panel (1). (see figure 3-51)
2. Position insert panel (2) to underside of left front floor panel (1) with the arrow facing down and toward front of vehicle. (see figure 3-52)

3-13. Tact. Trucks cont.

3. Using left front seat support (1) as a template, mark twenty-four hole locations (3) onto insert panel (2). (see figure 3-53)
4. Using left front floor panel (1) as a template, mark eleven hole locations (3) onto insert panel (2).
5. Using insert panel (2) as a template, mark thirty-one hole locations (3) onto underside of left front floor panel (1). (see figure 3-52)
6. Remove insert panel (2).
7. Drill thirty-one 0.187-inch diameter holes marked in step 5 in underside of left front floor panel (1). (see figure 3-54)
8. Drill thirty-five 0.187-inch diameter holes marked in steps 3 and 4 in insert panel (1). (see figure 3-55)

J. Insert Panel and Floor Panel Installation Procedure.

1. Place insert panel (1) on a suitable work surface with the arrow facing down and left. (see figure 3-55)
2. Apply approximately 0.125-inch thickness of NSN 8040-01-154-0031 Depends No-Mix (Part 2 Adhesive) to area surface shaded on insert panel (1).
3. Apply approximately 0.125-inch thickness of P/N 89616 Silaprene adhesive sealant to area surface shaded on insert panel (1). (see figure 3-56)
4. Apply NSN 8030-01-154-0031 Depends No-Mix (Part 1 Spray) to area surfaces shaded on underside of left front seat support (2). (see figure 3-54)
5. Apply approximately 0.125-inch thickness of P/N 89616 Silaprene adhesive sealant to area surface shaded on underside of left front floor panel (1). (see figure 3-57)
6. Position insert panel (2) to underside of left front floor panel (1) with the arrow facing down and toward front of vehicle. (see figure 3-58)
7. Install eleven NSN 5320-01-264-5978 rivets (4) in holes in insert panel (2) and left front seat support (3).
8. Install three NSN 5320-01-271-6357 rivets (5) in holes in insert panel (2) and left front floor panel (1).
9. Install eighteen NSN 5320-01-271-6357 rivets (1) in holes in left front seat support (3) and insert panel (4). (see figure 3-59)
10. Install thirty-four NSN 5320-01-271-6357 rivets (1) in holes in left front floor panel (2) and insert panel (4).

3-13. Tact. Trucks cont.

11. Spot paint insert panel (2), left front seat support (3), and left front floor panel (4). (see figure 3-59) (Refer to TM 43-0139.)

K. Final Vehicle Preparation.

1. Install left floor insulation. (Refer to TM9-2320-280-20.)
2. Install front and rear seat support panels. (Refer to TM9-2320-280-20.)
3. Install driver's seat assembly. (Refer to TM9-2320-280-20.)
4. Install fire extinguisher mount bracket. (Refer to TM9-2320-280-20.)
5. Install fire extinguisher, if removed. (Refer to TM9-2320-280-10.)
6. Install tire chains, if removed. (Refer to TM9-2320-280-10.)
7. Install tool bag, if removed. (Refer to TM9-2320-280-10.)
8. Install tow chain, if removed. (Refer to TM9-2320-280-10.)
9. Install pamphlet bag, if removed. (Refer to TM9-2320-280-10.)
10. Install first aid kit, if removed. (Refer to TM9-2320-280-10.)
11. Install flashlight, if removed. (Refer to TM9-2320-280-10.)

PUBLICATIONS AFFECTED:

TM9-2320-280-20
TM9-2320-280-20P

LEVEL OF MAINTENANCE:

Unit

NOTE:
ALL DIMENSIONS ARE IN INCHES

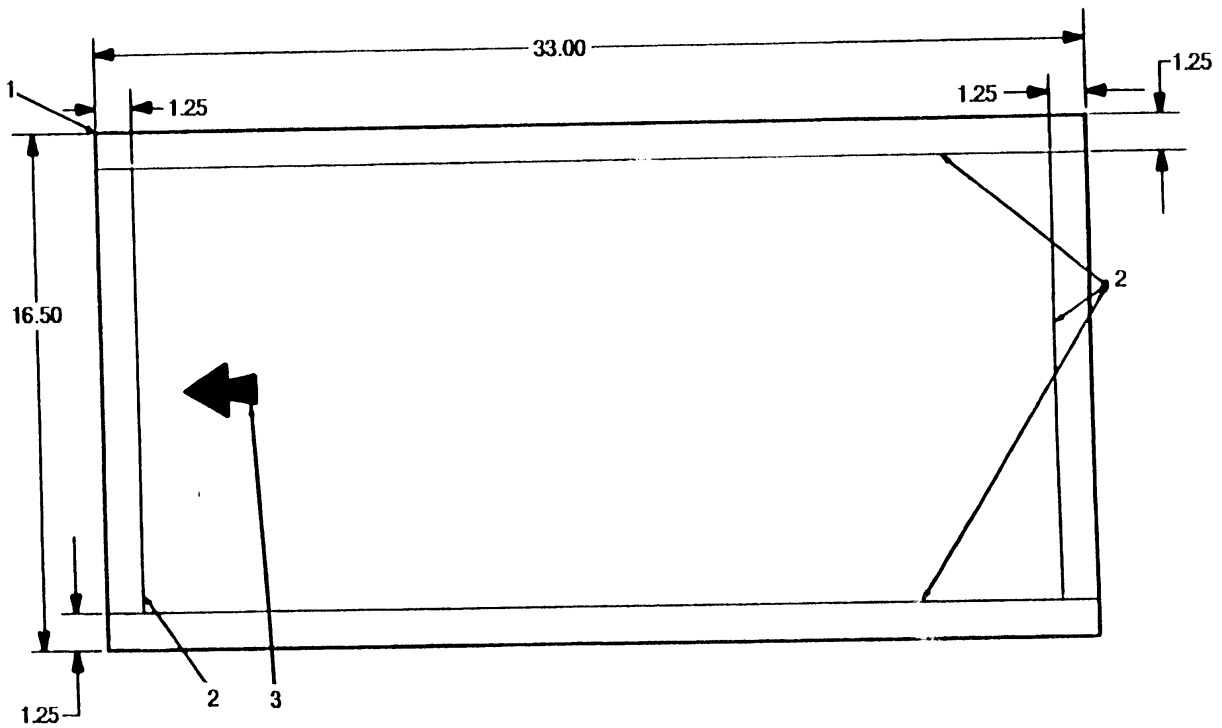


FIGURE 3-25

NOTE:
ALL DIMENSIONS ARE IN INCHES

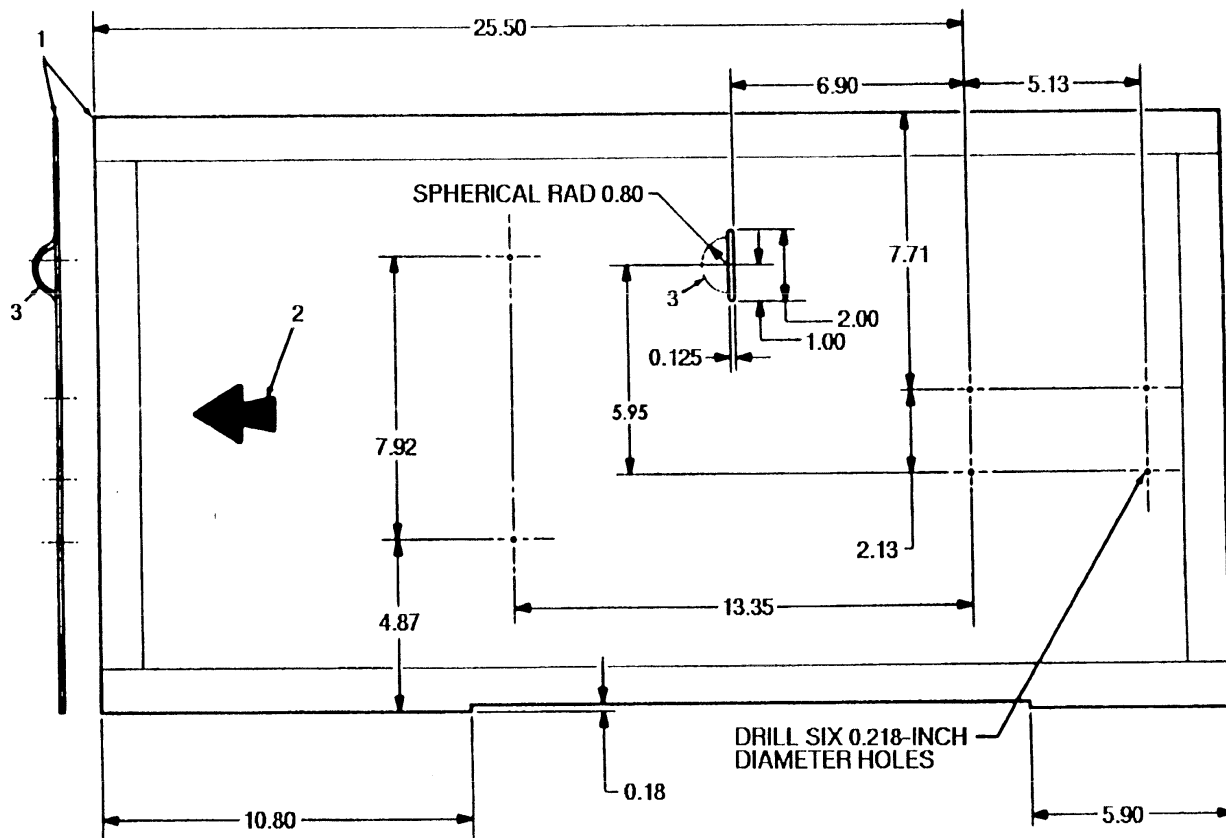


FIGURE 3-26

NOTE: ALL DIMENSIONS ARE IN INCHES

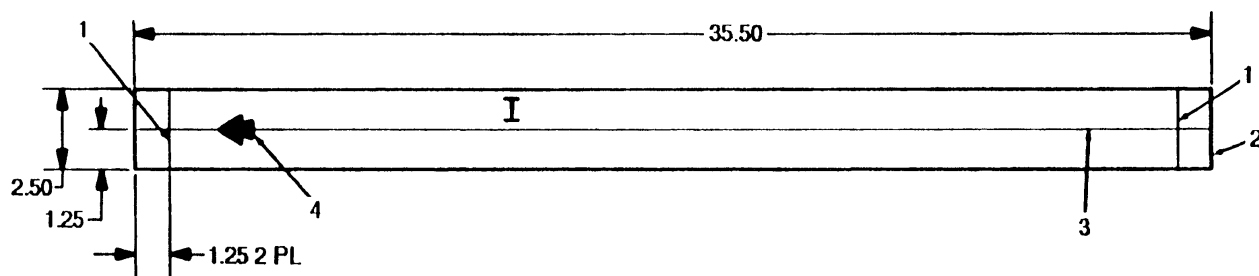


FIGURE 3-27

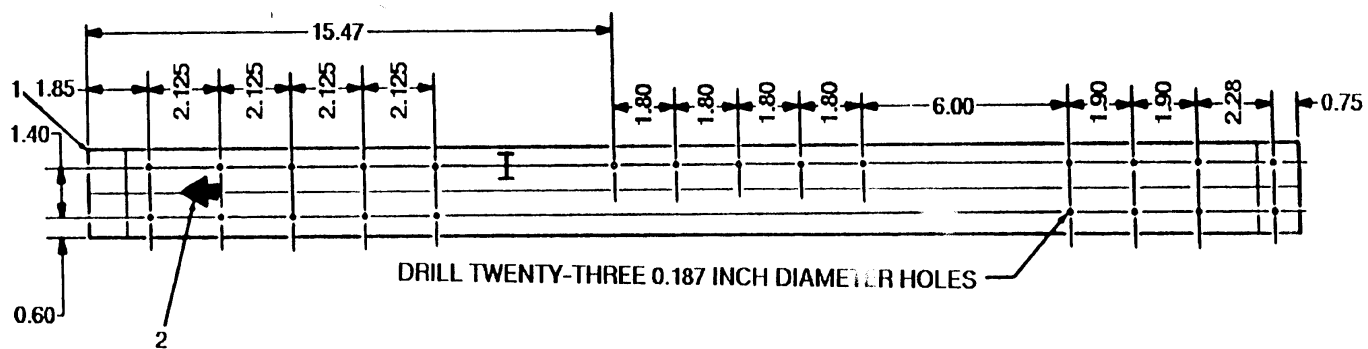


FIGURE 3-28





NOTE: ALL DIMENSIONS ARE IN INCHES

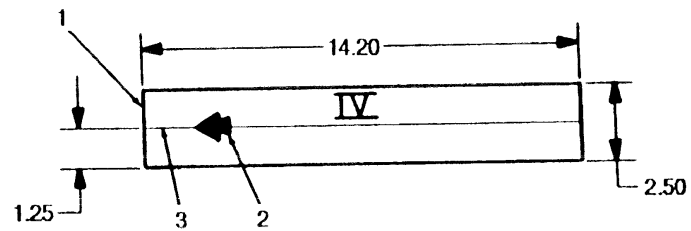


FIGURE 3-33

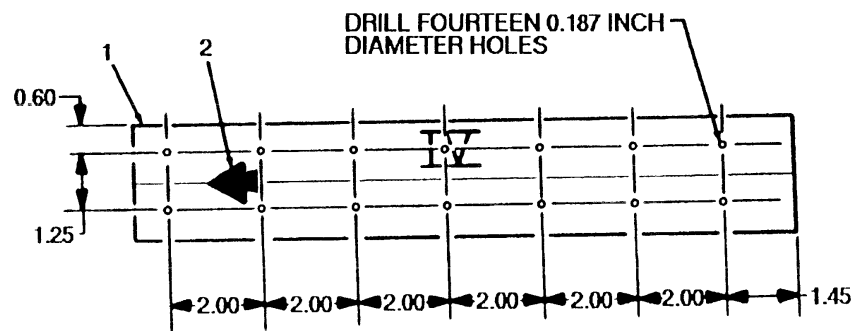


FIGURE 3-34

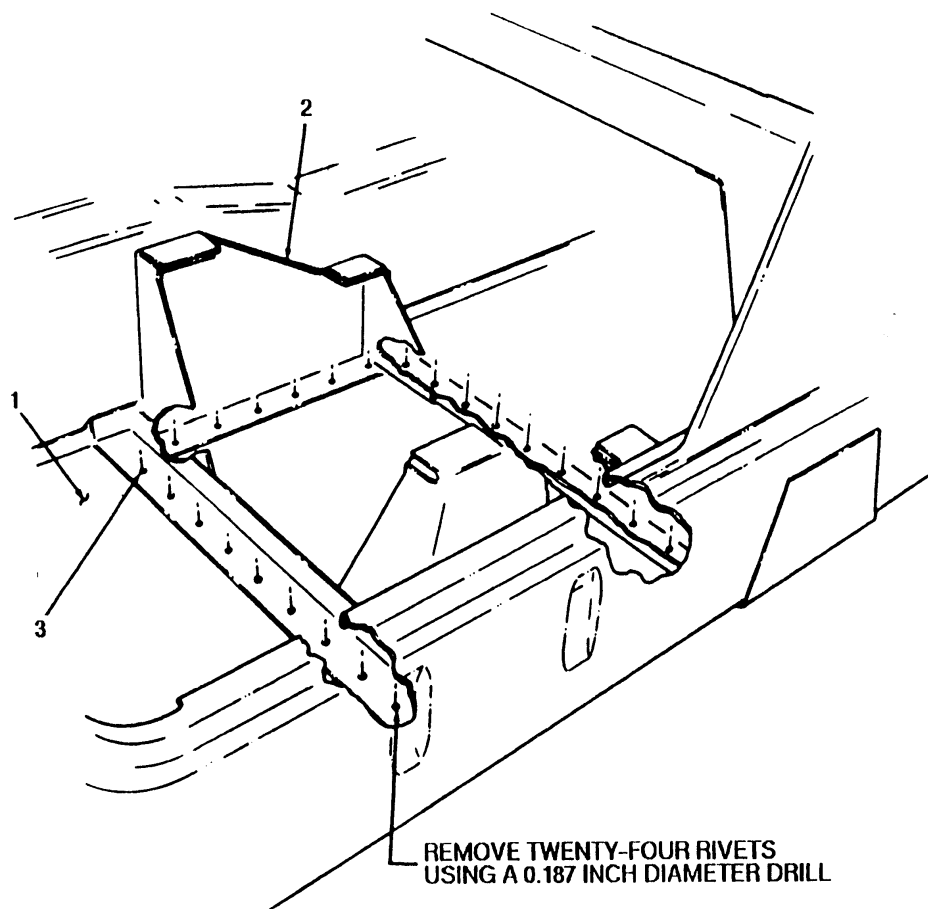


FIGURE 3-35

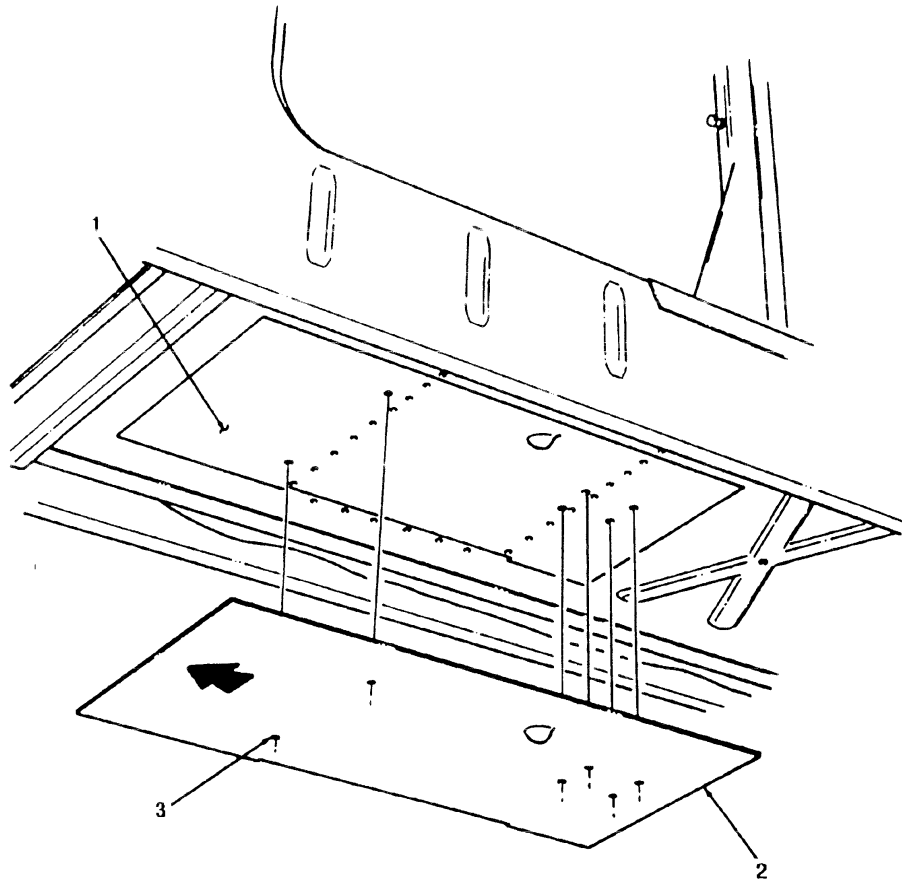


FIGURE 3-36

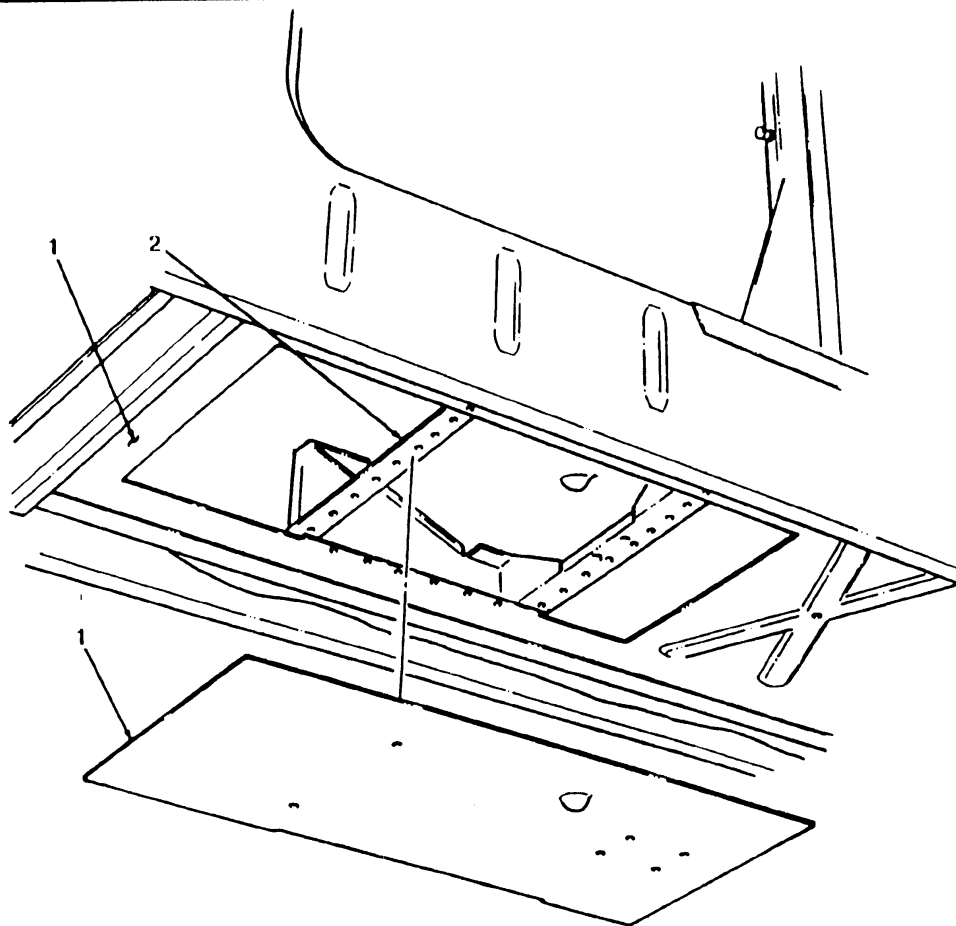


FIGURE 3-37

NOTE:
ALL DIMENSIONS ARE IN INCHES

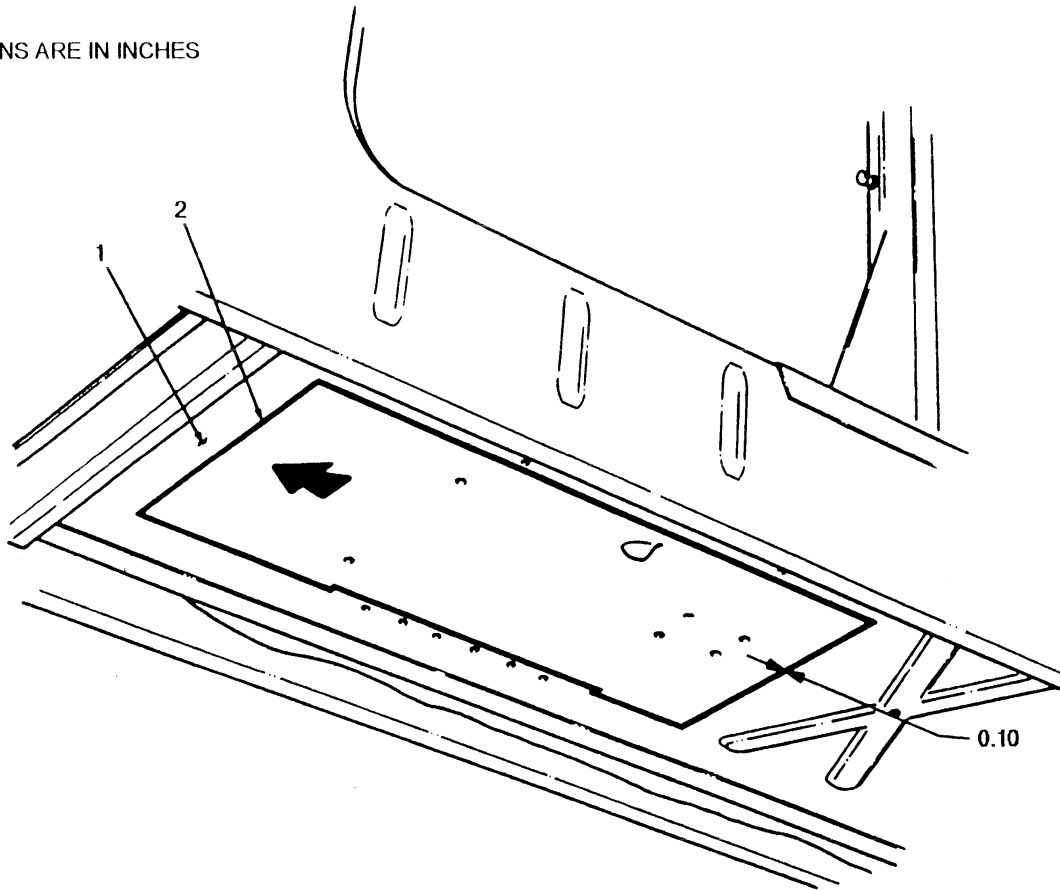


FIGURE 3-38

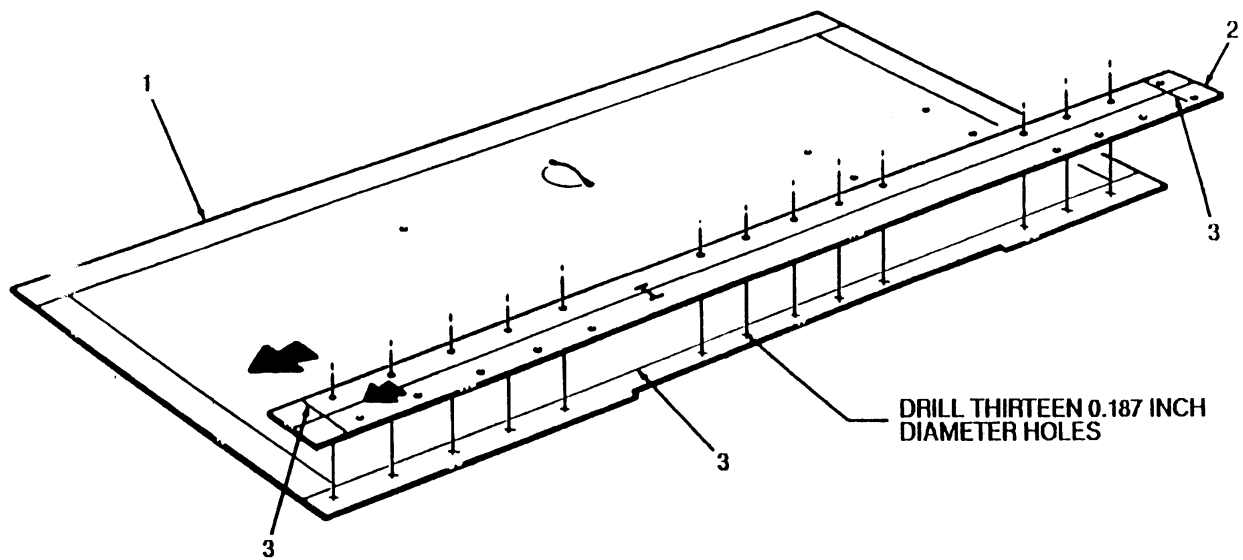


FIGURE 3-39

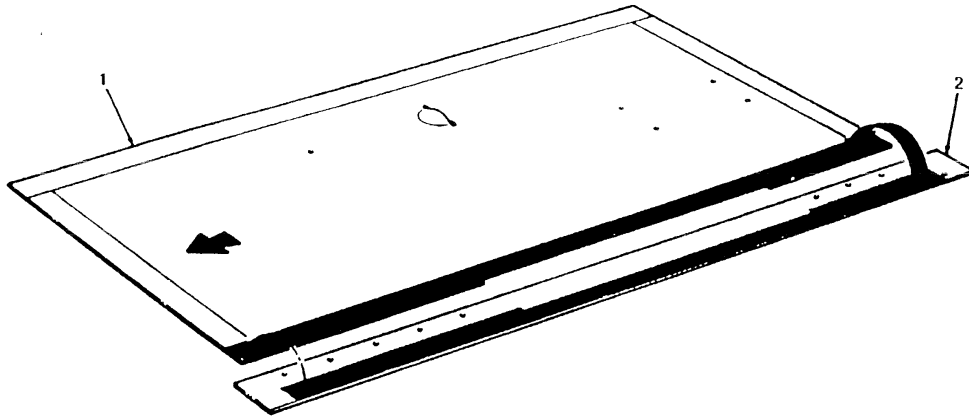


FIGURE 3-40

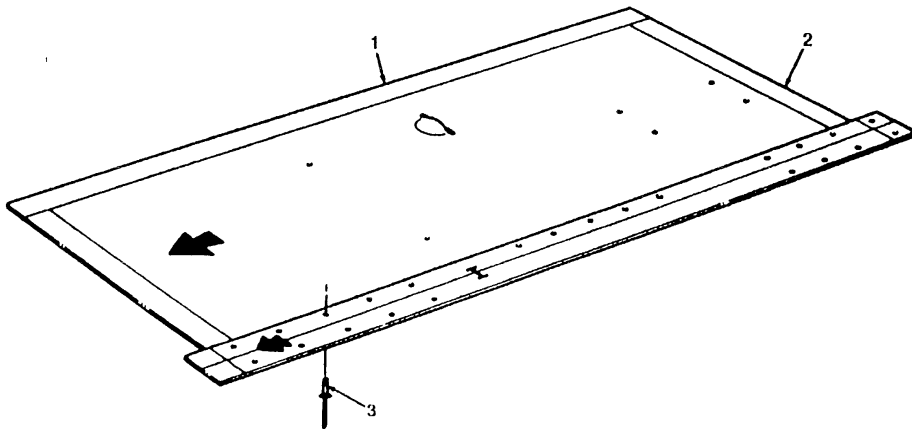


FIGURE 3-41

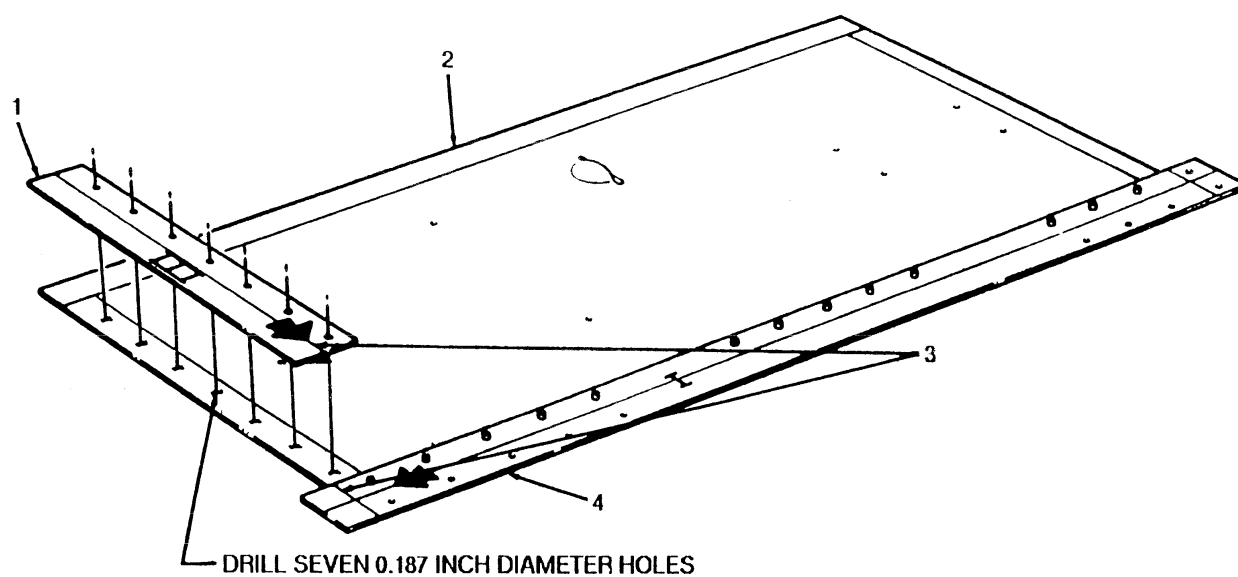


FIGURE 3-42

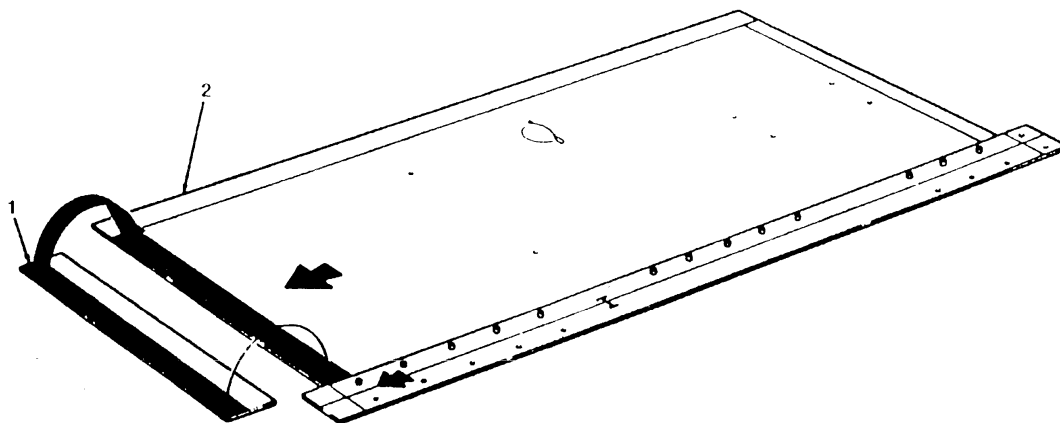


FIGURE 3-43

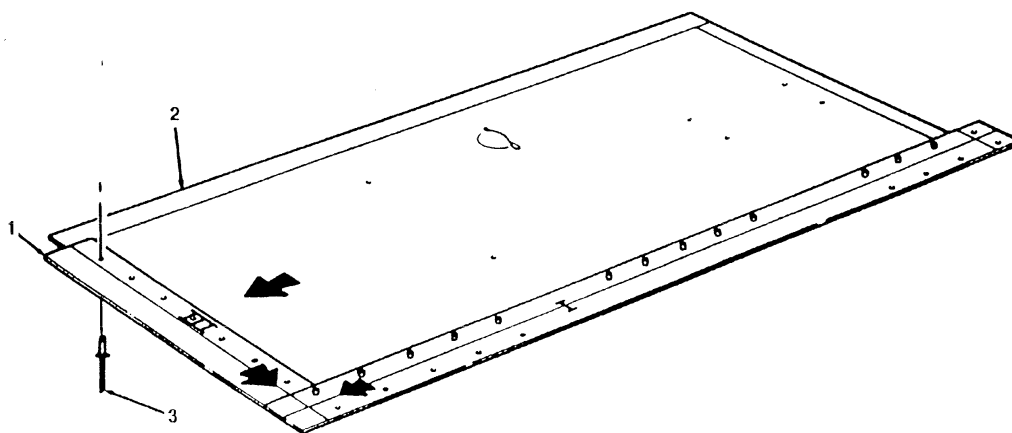


FIGURE 3-44

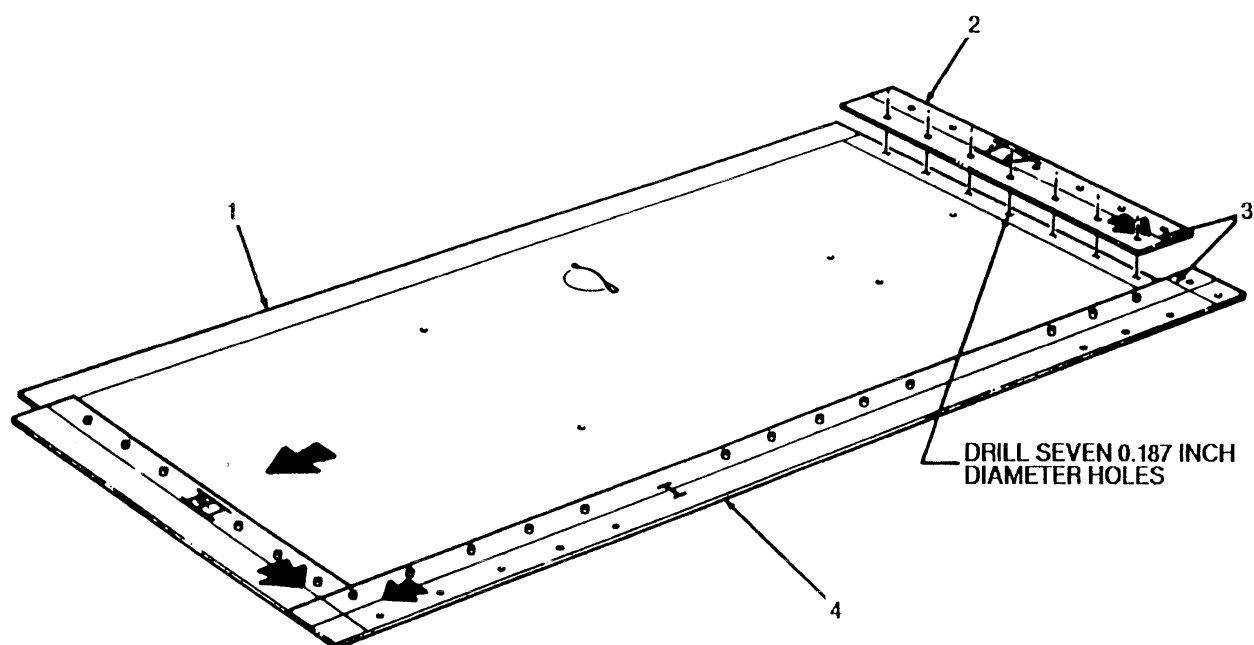


FIGURE 3-45

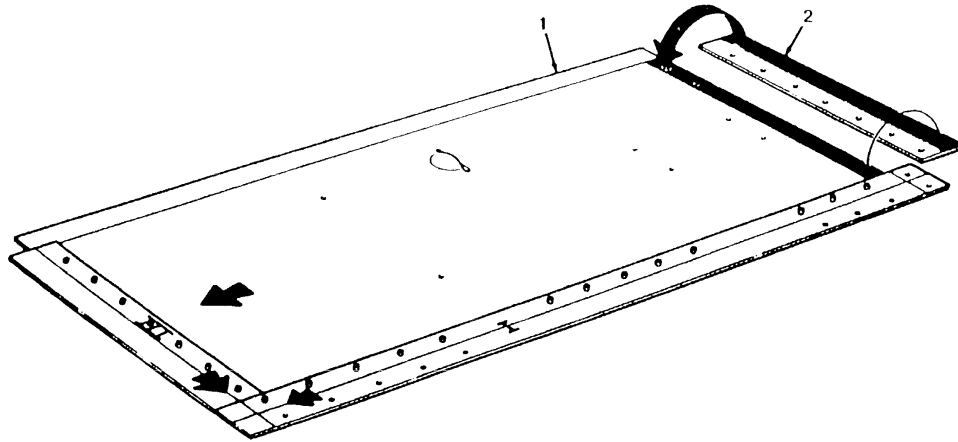


FIGURE 3-46

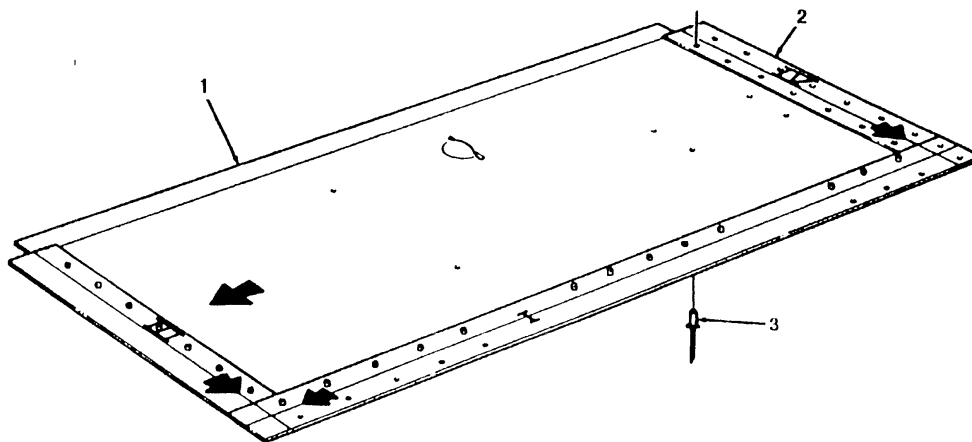


FIGURE 3-47

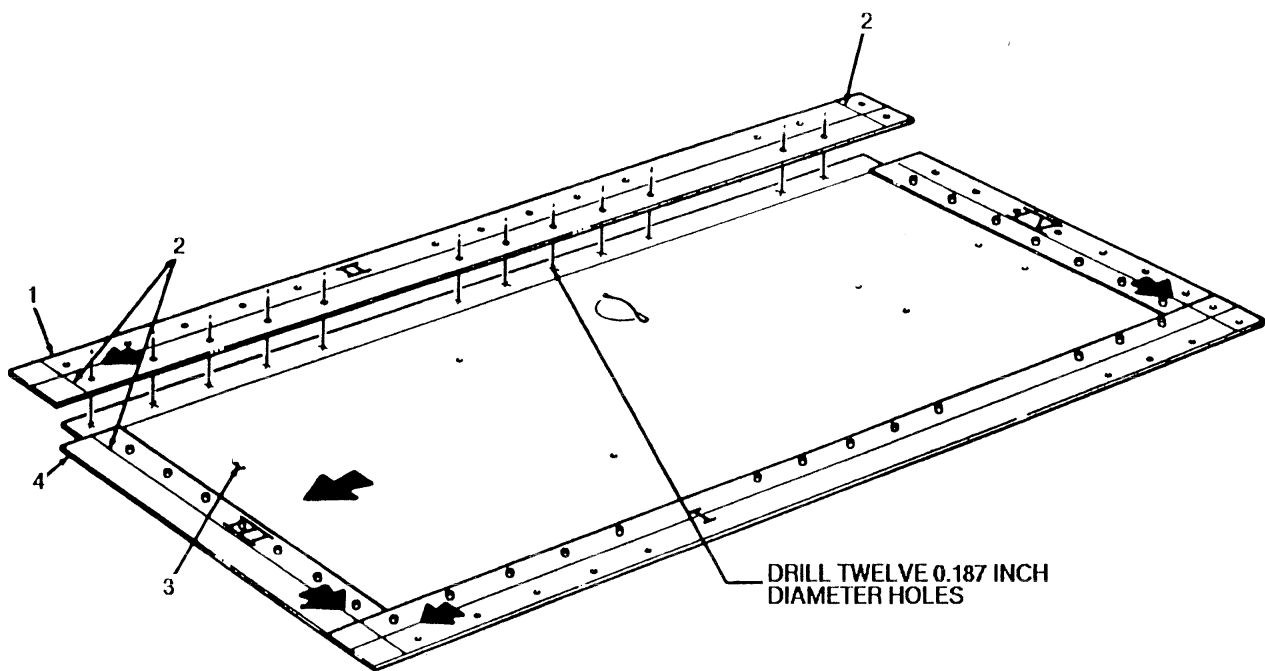


FIGURE 3-48

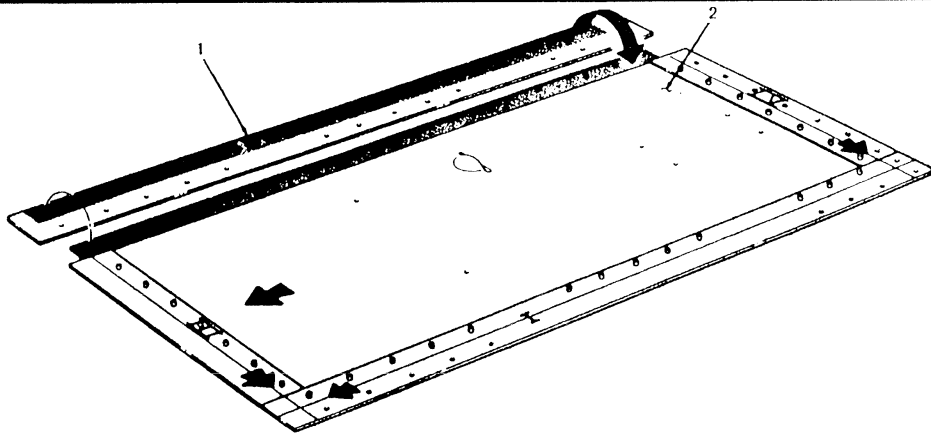


FIGURE 3-49

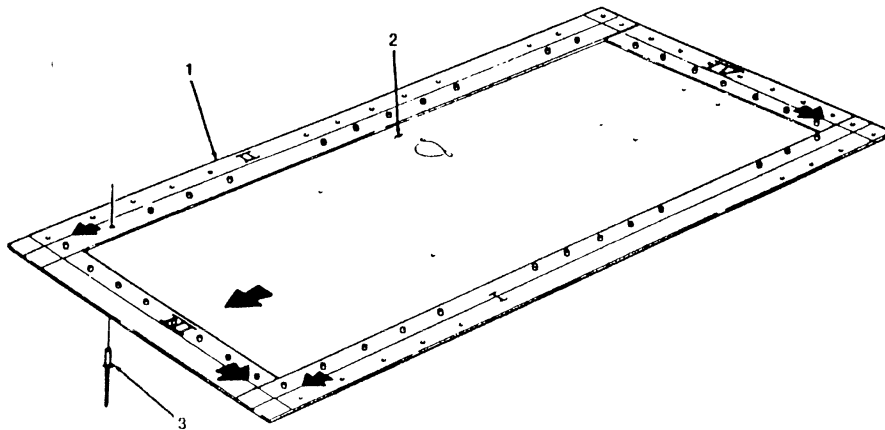


FIGURE 3-50

NOTE:
ALL DIMENSIONS ARE IN INCHES

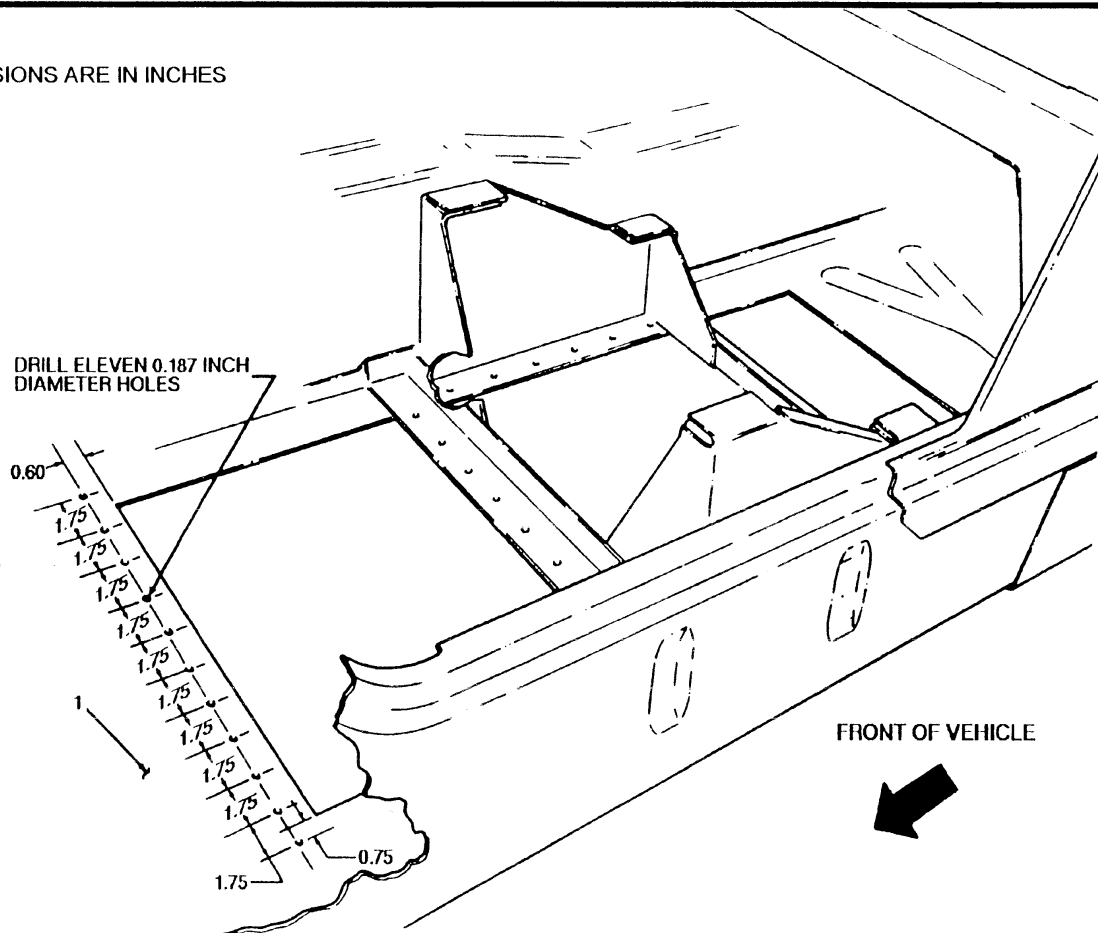


FIGURE 3-51

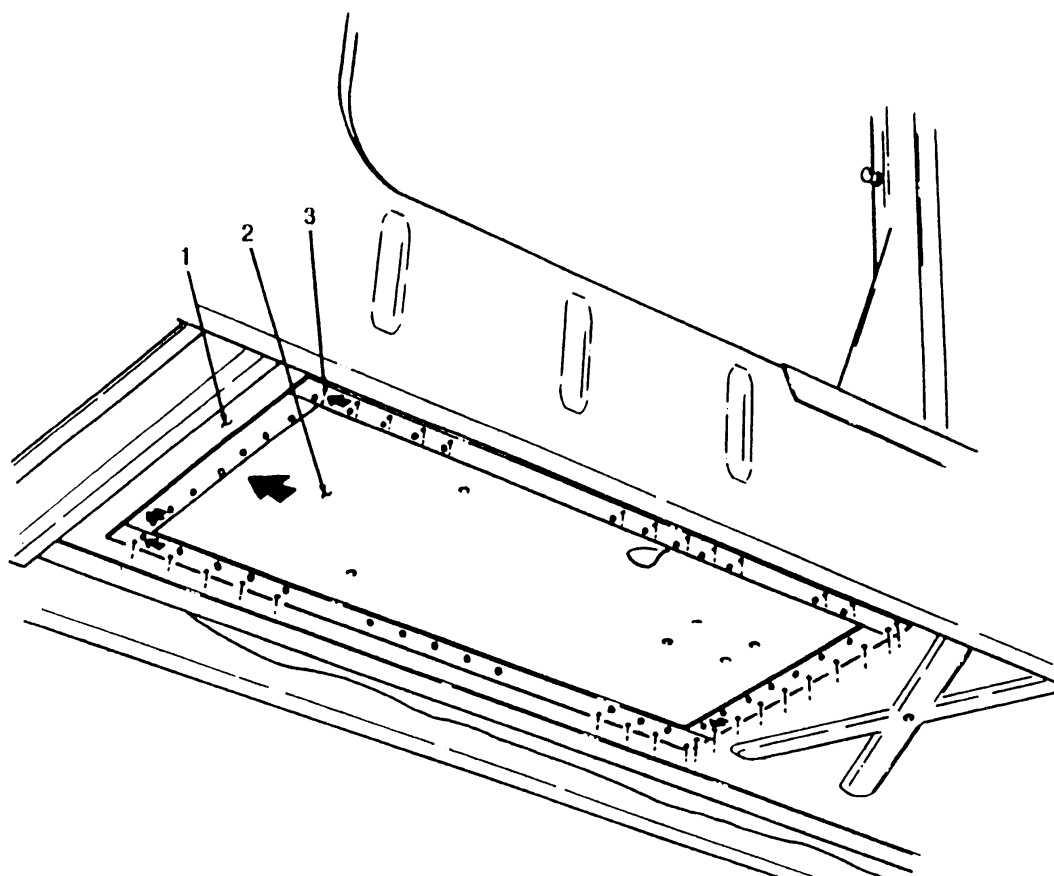


FIGURE 3-52

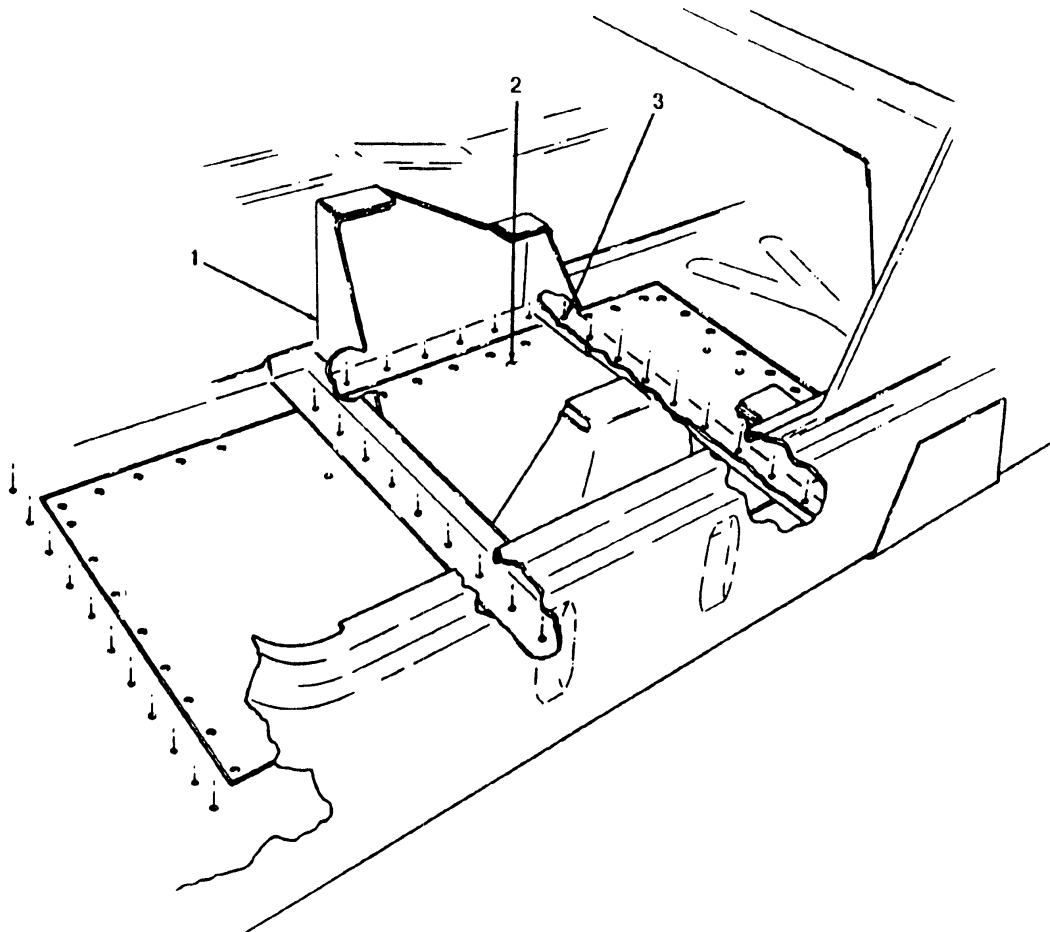


FIGURE 3-53

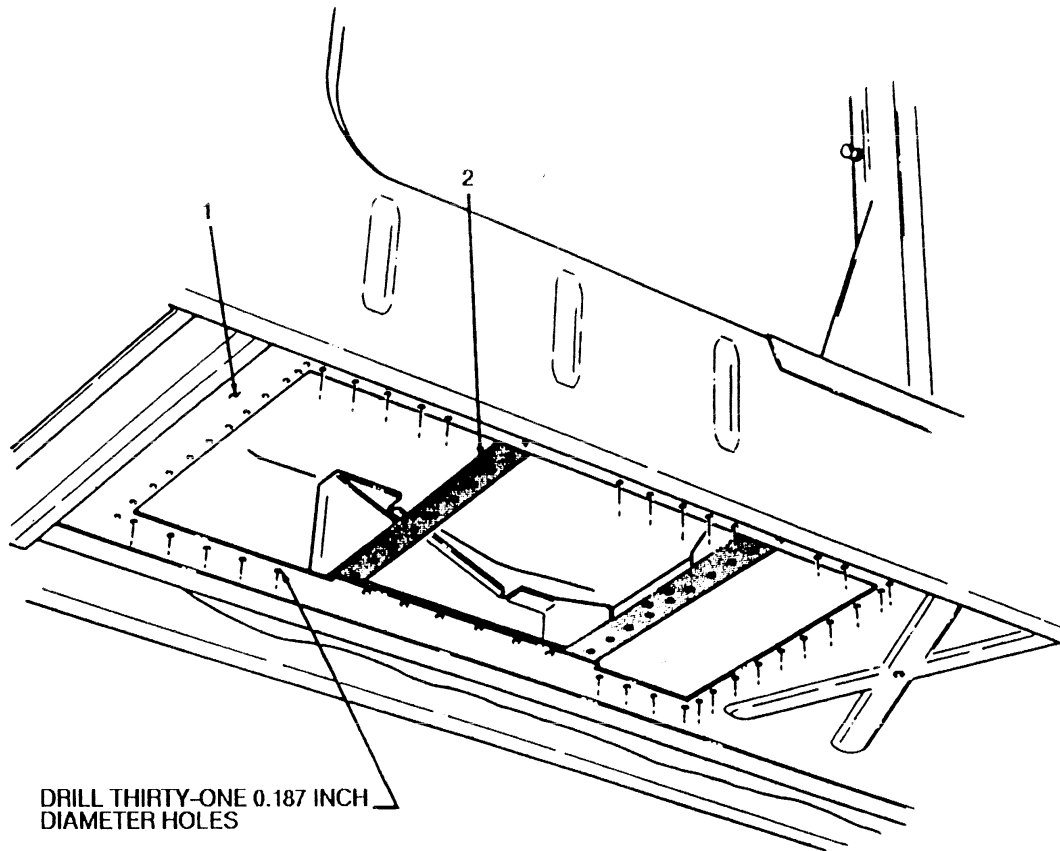


FIGURE 3-54

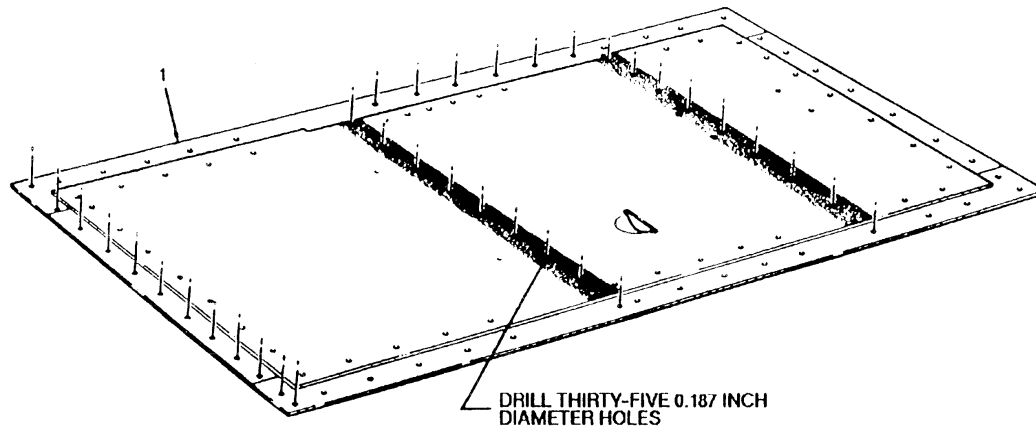


FIGURE 3-55

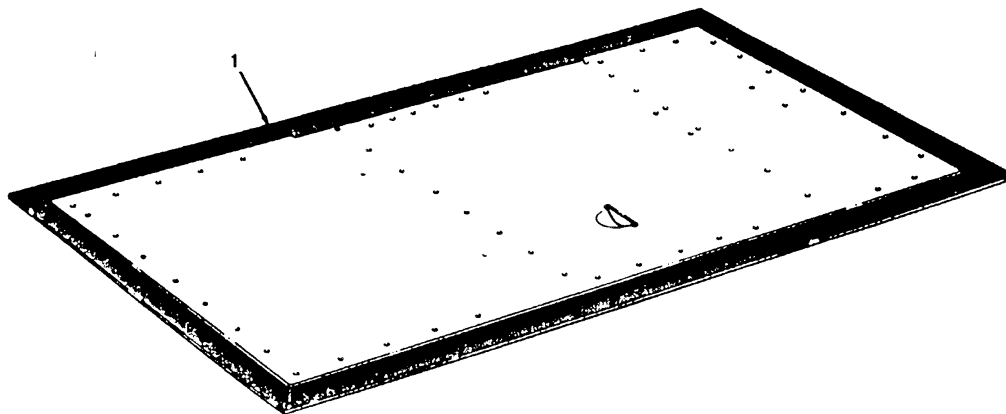


FIGURE 3-56

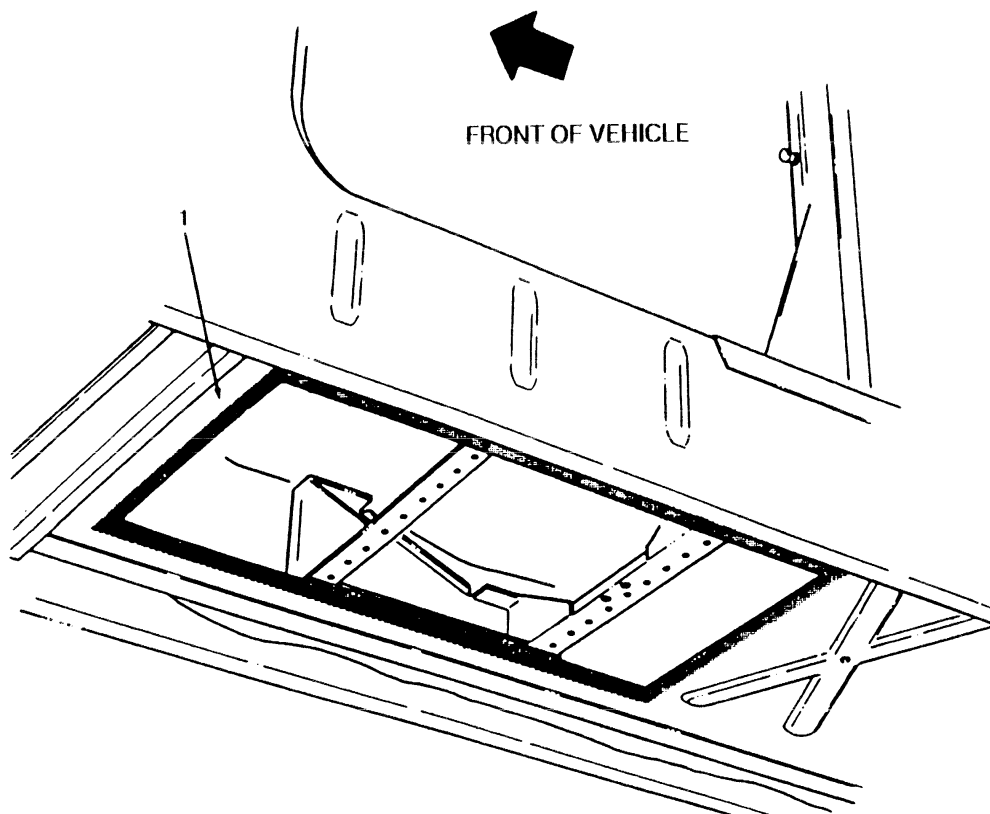


FIGURE 3-57

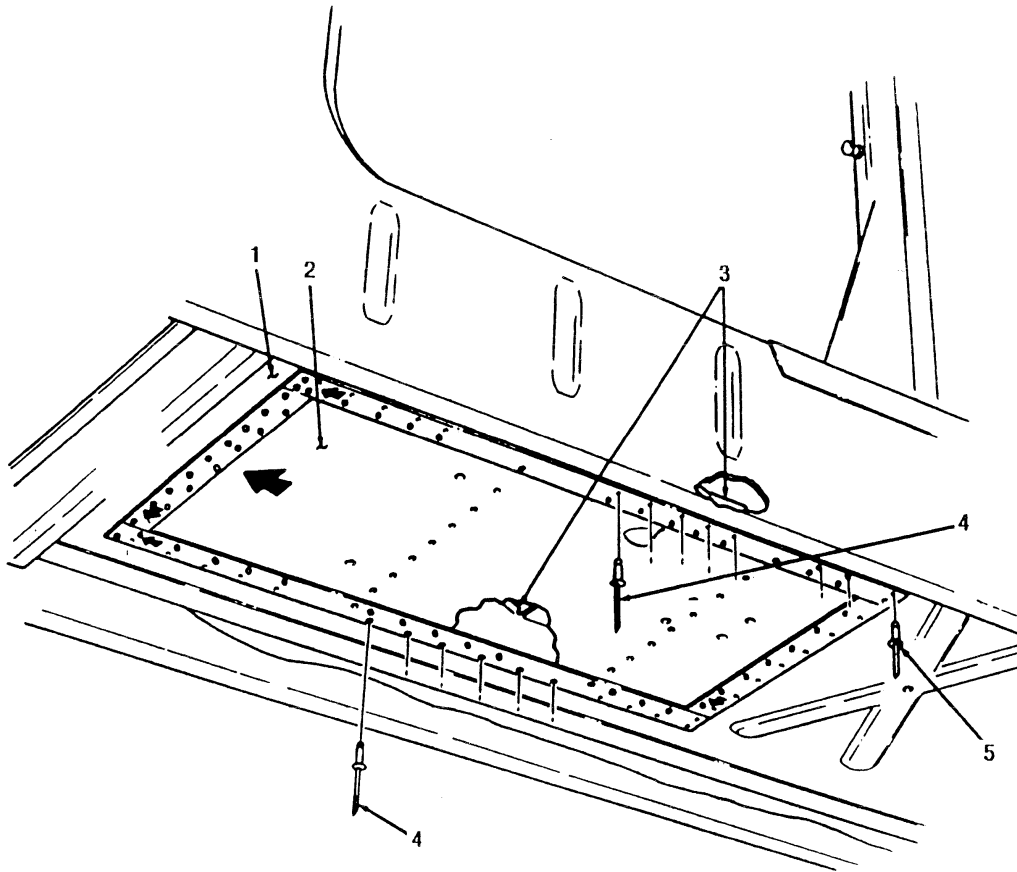


FIGURE 3-58

8-64

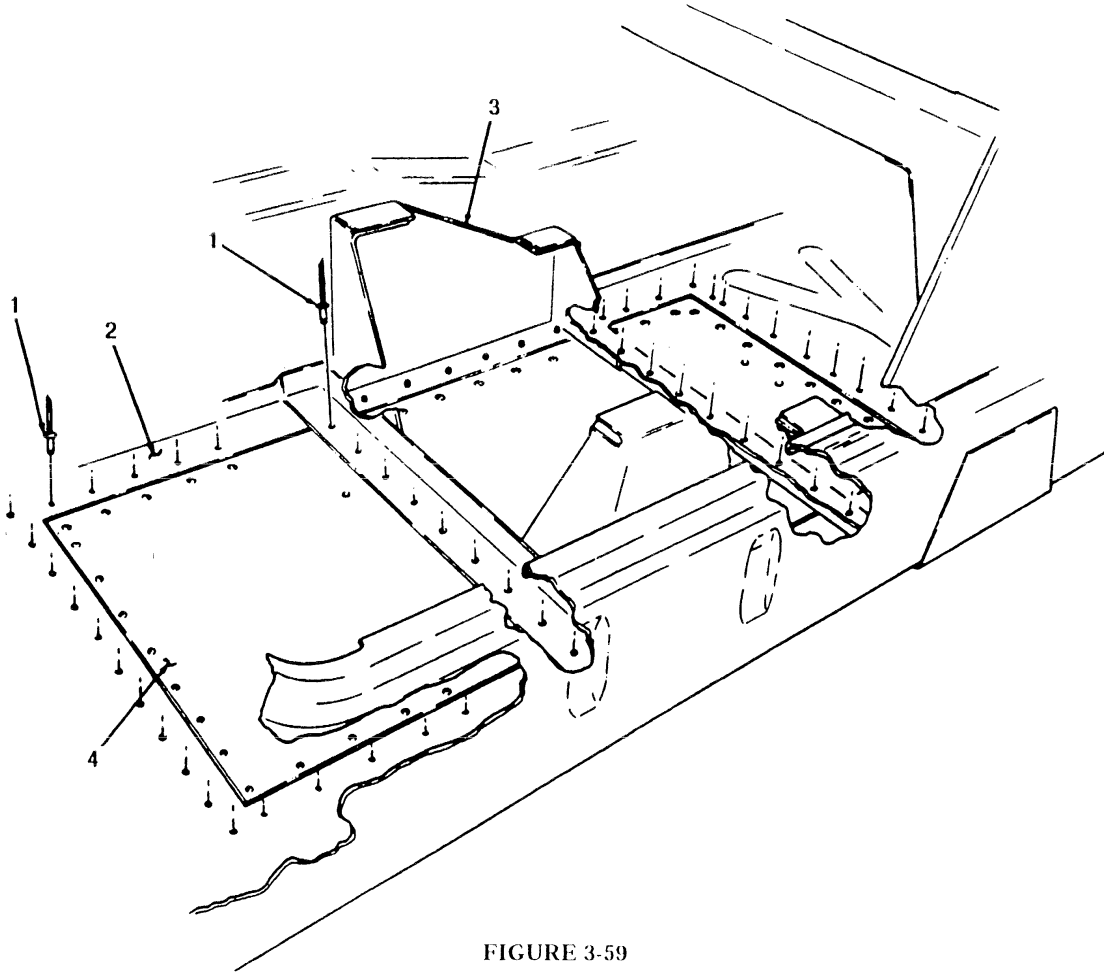


FIGURE 3-59

3-30. Tactical Trucks

MODEL:

HMMWV M998 Series

SUBJECT:

Pad Insulation, NSN 2510-01-209-1881

POC:

Ms. Jody McInerney, AMSTA-MTA, DSN 786-7346

DEFICIENCY:

The units are receiving the wrong size pad, insulation for the front floor. (TM9-2320-280-34P or TM9-2320-280-20P, dated Aug 91 w/change 1, Figure 176, Item 12)

COMMENTS:

A. The part number for figure 176, item 12 is incorrect. It should be (19207) 12339908. The NSN will remain 2510-01-209-1881. At present time, there is zero on hand. DCSC (S9C) is aware of this discrepancy and is taking action to correct the problem. The next buy will contain the correct size (61 inch piece).

B. As for P/N (19207) 12339909, this is the correct part number for the padding used on the Arctic Kit. This item is shown in the above referenced TM's, on Figure 306, Item 33. The NSN for this item is 2510-01-376-1092.

PUBLICATIONS AFFECTED:

TM9-2320-280-34P

TM9-2320-280-20P

LEVEL OF MAINTENANCE:

Unit

3-66

Author: Douglas Phillips at bldg231post
Date: 11/7/94 5:32 PM
Priority: Normal
TO: Kathleen Catenaro at AMSTAM2POST
Subject: Seat Message

----- Message Contents -----

UNCLASSIFIED

292151Z JUL 94 PP UUUU ZYUW 2102151Z

NO

PEO TACTICAL WHEELED VEHICLES WARREN M1 //SFAE_TWV_SP//
CDRFORSCOM FT MCPHERSON GA 1/AFOP_FIM//
CINCUSAREUR HEIDELBERG GE //AEAGC_FMO//
CDRUSARPAC FT SHAFTER H1 //APOF_PB//
CDRUSARC FT MCPHERSON GA //AFRC_FDI//
CH ARNG WASHINGTON DC //NGB_ARFI//
CDRUSAEIGHT SEOUL KOREA //EACJ_FD//
CDRUSASOC FT BRAGG NC //AOFI_COF//
AIG 9004

UNCLAS

SUBJECT: APPLICATION OF UNAUTHORIZED MODIFICATION TO HMMWV MODELS,
AM GENERAL SEAT KIT (AMG PART NUMBER 5743095)

A. MESSAGE, PEO_TWV, SFAE_TWV_TVL, 171129Z MAR 94, SUBJECT AS ABOVE.

1. WE HAVE FINALIZED THE CONFIGURATION WITH AM GENERAL. NSN FOR A
PARTS KIT TO UPGRADE THE DRIVER'S/COMMANDER'S SEAT INSTALLATION IS
2590_01_393_3796 (PART NUMBER: 57K0290, CAGE 19207). ESTIMATED
AVAILABILITY DATE TO SUPPORT FIELD REQUISITIONS FOR MODIFICATION KIT
IS 2ND QTR FY95.

2. ANY QUESTIONS MAY BE DIRECTED TO MR. DOUG PHILLIPS, DSN 786_6710
OR COMMERCIAL 810_574_6710.

DOUGLAS E. PHILLIPS, WSM, HMMWV
SFAE_TWV_SPH, 46710

JOHN D. WEAVER, PM_TVSP, 46450

-UNCLASSIFIED

292151 ZJUL94

Hope I am sending to the right person. I lost the message on the
answering machine and am not sure if I heard right.
will attach a wp 5.2 file

Doug

18-67

3-8. Tactical Trucks

MODEL:

All HMMWVs Equipped With Two or Three-Point Seatbelts, Except M996 and M997

SUBJECT:

Seatbelt Strux Nut Replacement

POC:

Mr. Eddie Bynum, AMSTA-IM-HLA, DSN 786-7567, Commercial (810) 574-7567
bynume@cc.tacom.army.mil

DEFICIENCY:

Reports from the field indicate a lack of support for the seatbelt strux nut.

COMMENTS:

Procedures have been developed for replacing the seatbelt strux nut.

MATERIALS/PARTS:

<u>NSN/PN (CAGEC)</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
5310-01-253-8437	Washer, Flat	1
5310-01-315-3403	Nut	1
12340259-10 (19207)	Bolt (two-point seatbelt)	1
12340259-11 (19207)	Bolt (three-point seatbelt)	1
12340259-12 (19207)	Bolt (two-point seatbelt)	1
12340259-13 (19207)	Bolt (three-point seatbelt)	1
5340-01-246-8282	Bracket, Mounting, Left	1
5340-01-248-7646	Bracket, Mounting, Right	1

PROCEDURES:**WARNING**

Use of hardware not listed in this article may result in seatbelt failure, causing injury to personnel.

NOTE

This article is not intended to provide repair information about torn sheet metal, or damaged and bent brackets.

18-68

3-8. Tact. Trucks cont.

A. Left and Right Front Seatbelt Tunnel Strux Nut Replacement.

NOTE

It may be necessary to remove fuel tank on passenger side of vehicle.
(Refer to TM 9-2320-280-20.)

It may be necessary to cut and bend down lip on tunnel and footwell to gain access to strux nut on left front of two-point seatbelt.

1. Remove bolt (3), washer (4), strux nut (5), and seatbelt (2) from tunnel (1). (see figure 3-15)
2. Install 12340259-10 bolt (3) (for two-point seatbelt) or 12340259-11 bolt (3) (for three-point seatbelt) through seatbelt (2), existing washer (4), and tunnel (1). Secure with NSN 5310-01-253-8437 washer (5) and NSN 5310-01-315-3403 nut (6). Tighten bolt to 35-40 lb-ft (47-54 N•m). (see figure 3-16)

B. Left and Right Front Seatbelt Mounting Bracket Replacement.

1. Remove bolt (4) and washer (2) from seatbelt (3) and mounting bracket (1). (see figure 3-17)
2. Remove four screws (1) and (3), two washers (2), and mounting bracket (4) from B-pillar (5). (see figure 3-18)
3. Install NSN 5340-01-246-8282 left mounting bracket (4) or NSN 5340-01-248-7646 right mounting bracket (4) on B-pillar (5). Secure with four screws (1) and (3) and two washers (2).
4. Install seatbelt (3) on mounting bracket (1) with washer (2) and bolt (4). Tighten bolt to 35-40 lb-ft (47-54 N•m). (see figure 3-17)

C. Left and Right Rear Seatbelt Tunnel Strux Nut Replacement.

NOTE

It may be necessary to remove fuel tank if working on passenger side of vehicle. (Refer to TM 9-2320-280-20.)

1. Remove bolt (1), washer (3), strux nut (4), and seatbelt (2) from tunnel (5). (see figure 3-19)
2. Install 12340259-10 bolt (1) (for two-point seatbelt) or 12340259-11 bolt (1) (for three-point seatbelt) through seatbelt (2), existing washer (3) and tunnel (6). Secure with NSN 5310-01-253-8437 washer (4) and NSN 5310-01-315-3403 nut (5). Tighten bolt to 35-40 lb-ft (47-54 N•m). (see figure 3-20)

3-8. Tact. Trucks cont.

D. Left and Right Rear Seatbelt Mounting Bracket Strux Nut Replacement.

1. Remove bolt (4), washer (2), strux nut (5), and seatbelt (3) from mounting bracket (1). (see figure 3-21)
2. Install 12340259-12 bolt (4) (for two-point seatbelt) or 12340259-13 bolt (4) (for three-point seatbelt) through seatbelt (3), existing washer (2), and mounting bracket (1). Secure with NSN 5310-01-253-8437 washer (5), and NSN 5310-01-315-3403 nut (6). Tighten bolt to 35-40 lb-ft (47-54 N•m). (see figure 3-22)

PUBLICATIONS AFFECTED:

TM9-2320-280-20

TM9-2320-280-20P

LEVEL OF MAINTENANCE:

Unit

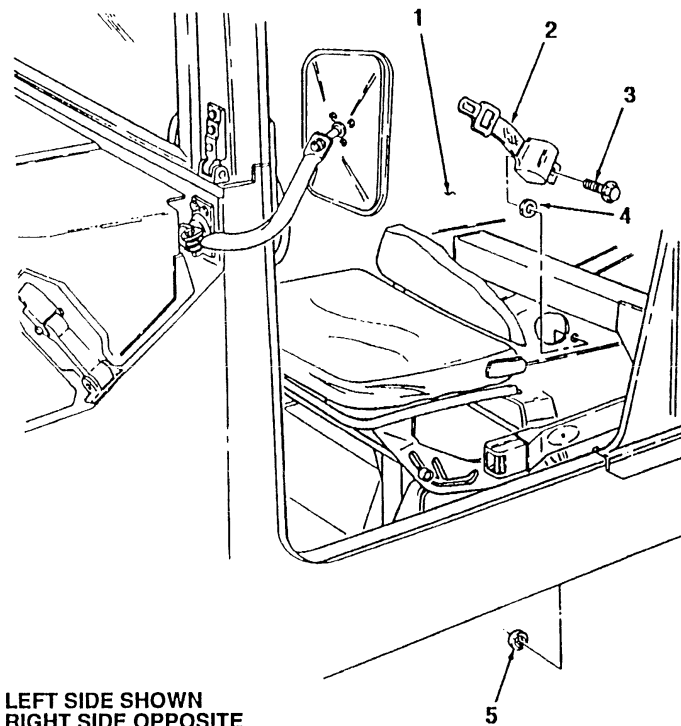


FIGURE 3-15

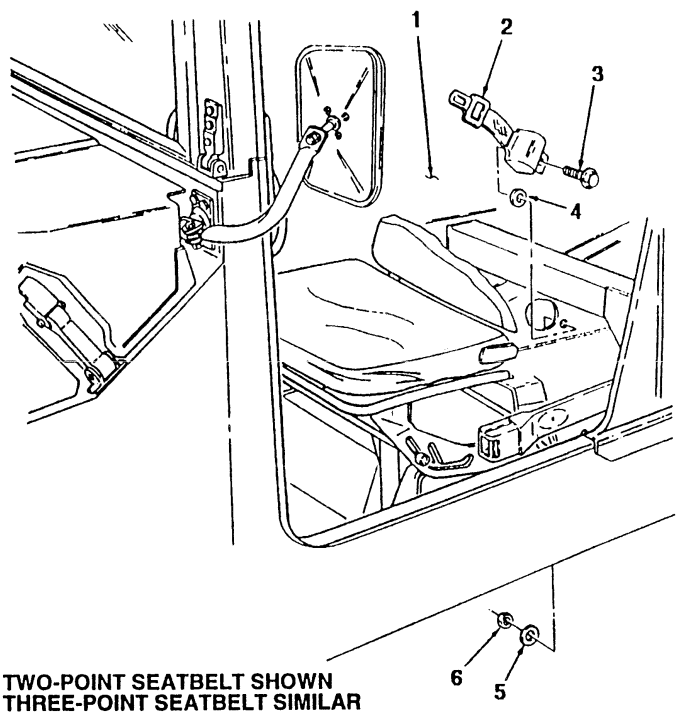
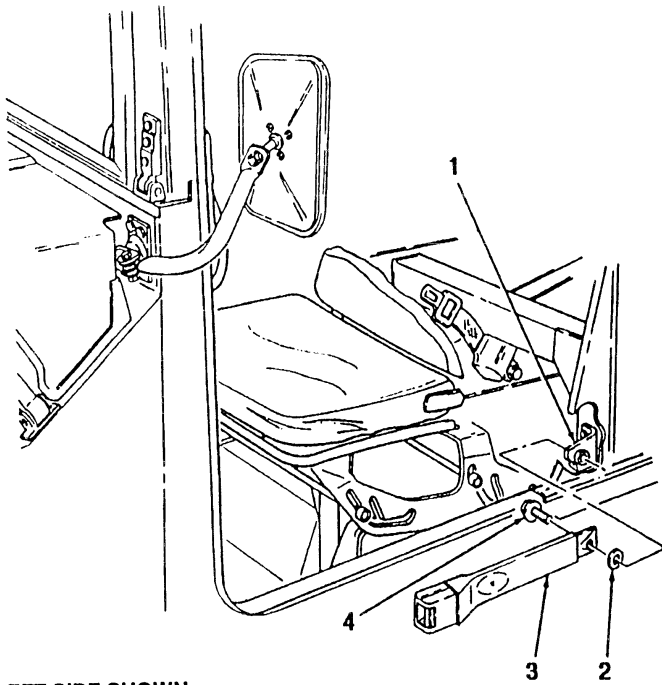
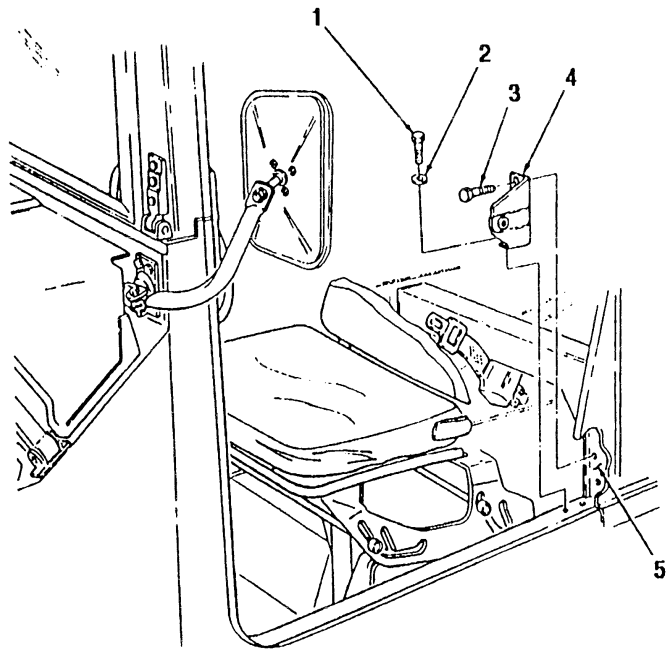


FIGURE 3-16



LEFT SIDE SHOWN
RIGHT SIDE OPPOSITE

FIGURE 3-17



TWO-POINT SEATBELT SHOWN
THREE-POINT SEATBELT SIMILAR

FIGURE 3-18

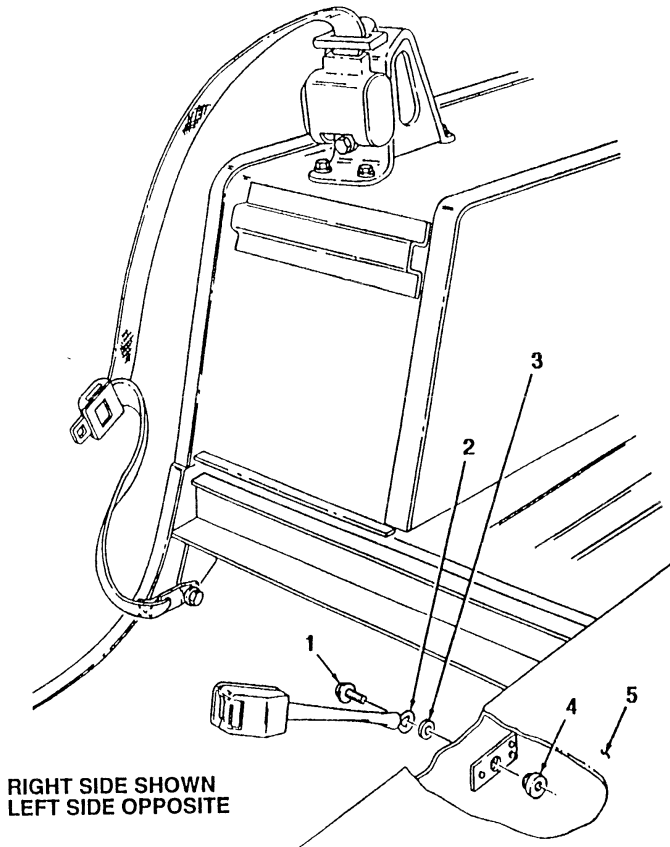


FIGURE 3-19

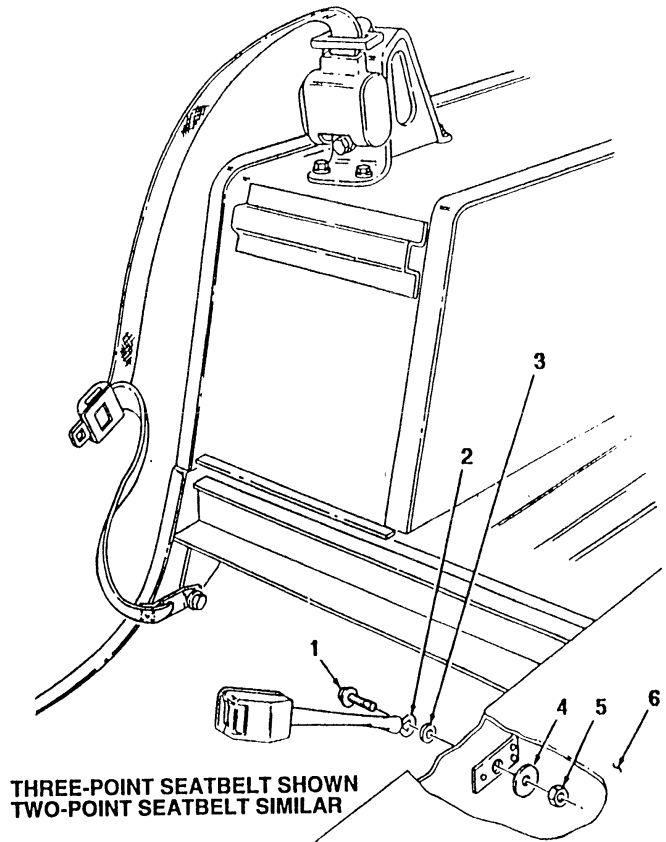


FIGURE 3-20

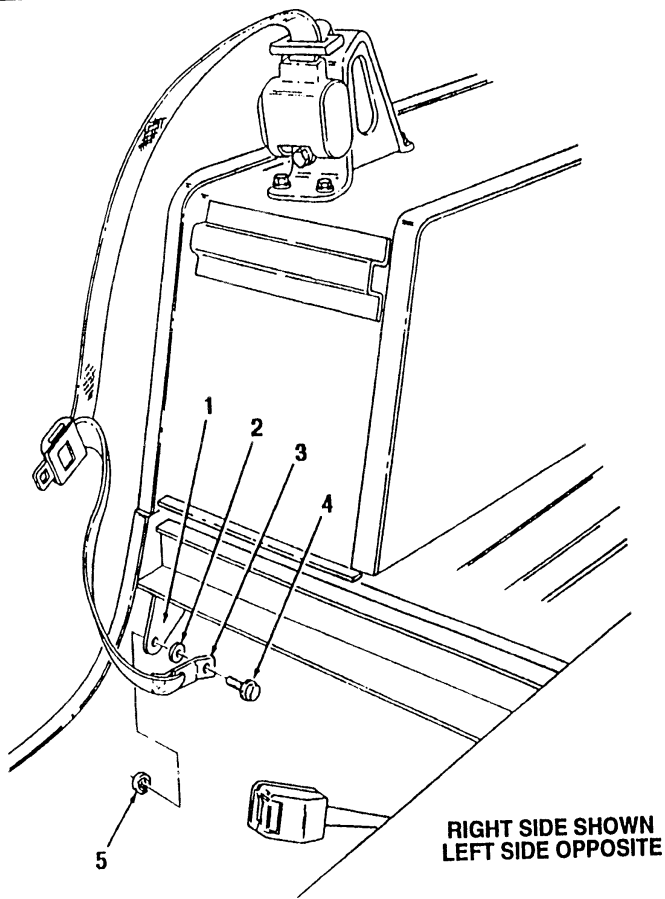


FIGURE 3-21

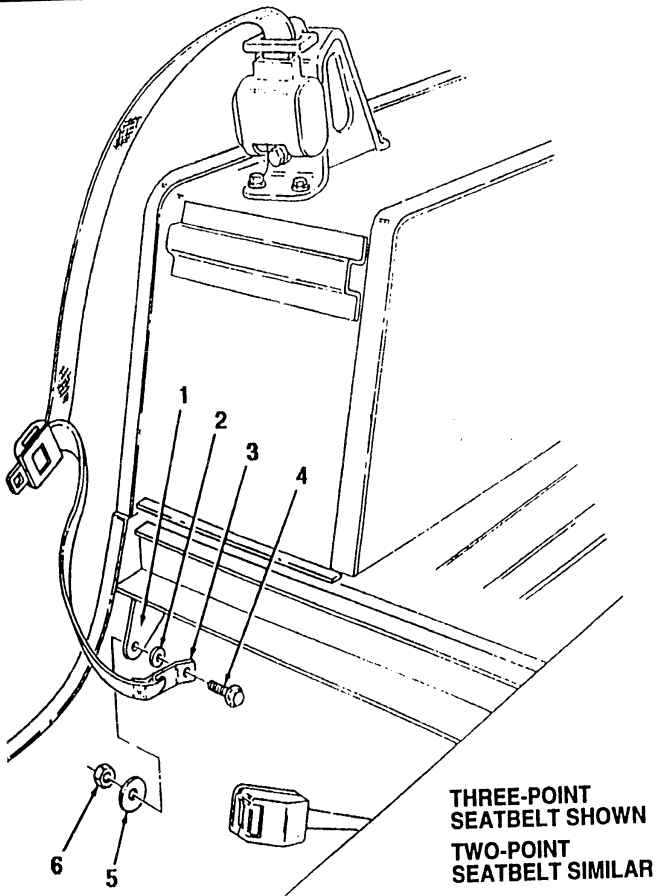


FIGURE 3-22

3-29. Tactical Trucks**MODEL:**

HMMWV M1025, M1026, M1043, and M1044

SUBJECT:

Pin Assembly Used on the Pintle Adapter.

POC:

Ms. Jody McInerney, AMSTA-MTA, DSN 786-7346

DEFICIENCY:

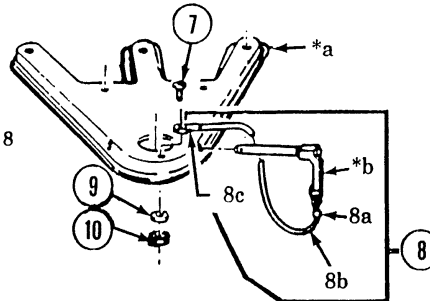
Currently, if the retaining cable breaks, the users must order the pin assembly.

COMMENTS:

The retaining cable can be replaced using parts available in the supply system. Below is figure 3-78 and a list of these parts. These changes will appear in the next change to TM9-2320-280-34P, Figure 219. This change is expected to be published 1QFY94.

<u>ITEM</u>	<u>CAGE</u>	<u>PART NUMBER</u>	<u>NSN</u>	<u>NOMENCLATURE</u>
8	19207	12340089	5315-01-197-7563	Pin Assembly
8A	81205	BACT14A6	4030-00-641-3921	Sleeve, Swage
8B	81349	MIL-W-83420/2-002-14	4010-01-205-9337	Rope, Wire
This is a make from item. 14 inches are required. Make form P/N MIL-W-83420/2-002				
8C	96906	MS20668-4	4030-00-132-9181	Terminal, Wire

NOTE: Item b is part of item 8

FIGURE 3-78**3-29. Tactical Trucks
cont.****PUBLICATIONS AFFECTED:**

TM9-2320-280-34P

TM9-2320-280-20P

LEVEL OF MAINTENANCE:

Unit

18-75

POC:

Ms. Jody McInerney, AMSTA-IM-MTA, DSN 786-7346, Commercial (810) 574-7346
mcinernj@cc.tacom.army.mil

4-11. Tact. Trucks cont.**DEFICIENCY:**

Due to a lack of clearance between the Tow missile stowage case and the tunnel floor insulation board, the end of the missile case can be damaged.

COMMENTS:

A procedure has been developed to remove the insulation board from tunnel floor, cut a section from the board, and reinstall the board to prevent damage to the Tow missile stowage case by increasing clearance between the case and the floor. This procedure can be accomplished in the field using the following procedure.

PROCEDURES:

1. Remove six screws (1) securing insulation board (2) to tunnel floor (3). (see figure 4-2)
2. Cut a section from the insulation board (2). (see figure 4-3)
3. Position insulation board (2) on tunnel floor (3) and secure with six existing screws (1).
4. Spot-paint insulation board as needed. (Refer to TM 43-0139.)

PUBLICATIONS AFFECTED:

TM9-2320-280-20P

TM9-2320-280-34P

LEVEL OF MAINTENANCE:

Unit

18-76

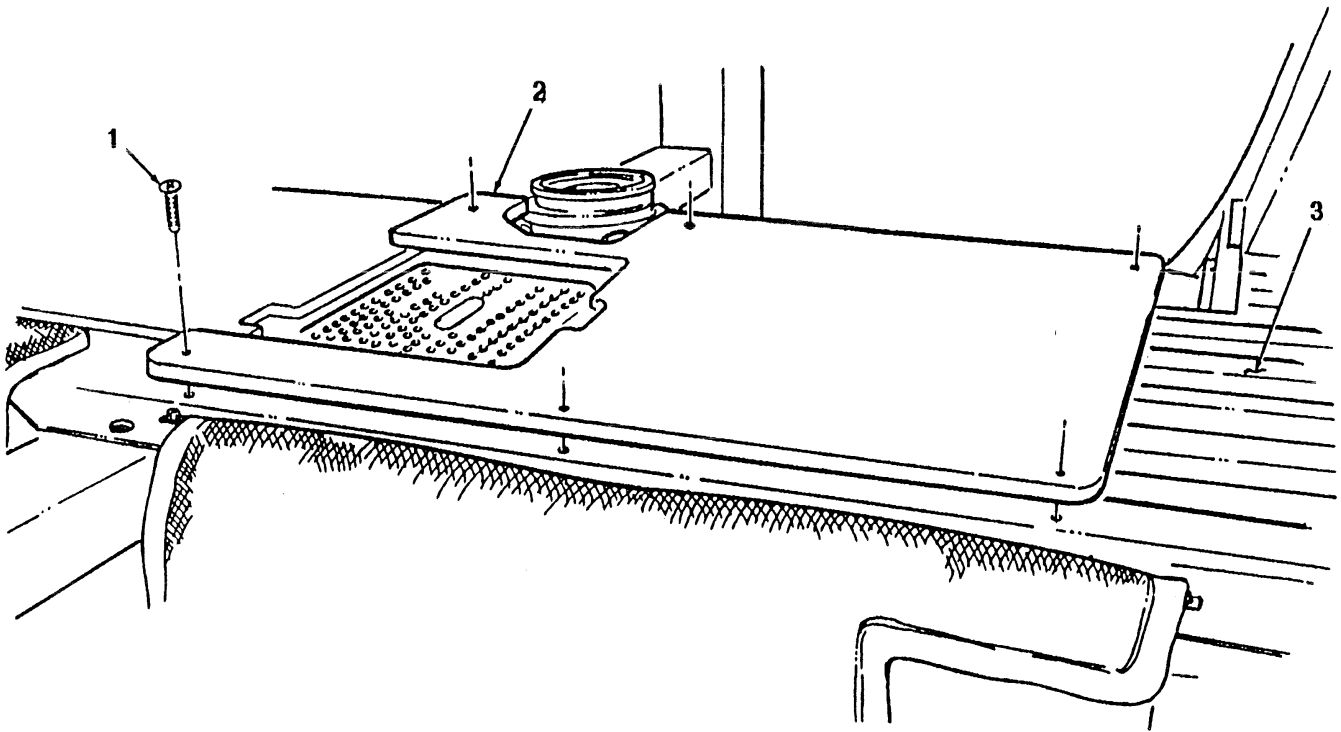


FIGURE 4-2

NOTE:
ALL DIMENSIONS ARE IN INCHES.

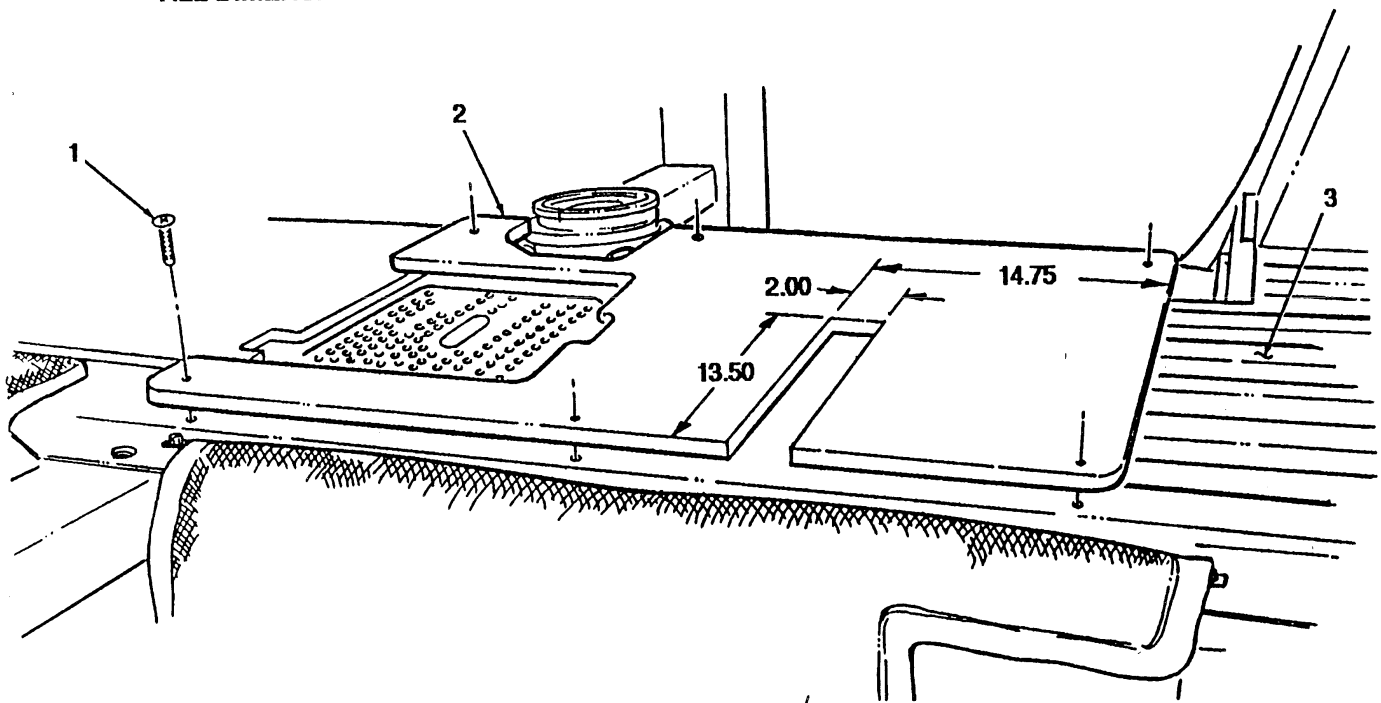


FIGURE 4-3

3-17. Tactical Trucks

MODEL:
HMMWV, M998 Series

SUBJECT:
Tailgate Chain Cover Replacement

POC:
Ms. Jody McInerney, AMSTA-MTA, DSN 786-7346, Commercial (810) 574-7346
mcinernj@cc.tacom.army.mil

DEFICIENCY:
Units lack technical manual replacement procedures for cracked and deteriorated tailgate chain covers.

COMMENTS:
Maintenance procedures have been developed to replace tailgate chain covers which are determined unservicable. Installation of tailgate chain covers can be accomplished in the field by using the following parts and procedures.

MATERIAL/PARTS:

<u>NSN or P/N</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
12339226-2	COVER**	1
*2510-01-252-8461	COVER	1
*2510-01-252-7903	COVER	1
*2510-01-252-7904	COVER	1
4010-01-194-8546	CONNECTOR	1, *3
5310-00-814-0673	LOCKNUT	2, *4

*For all S-250 Shelter configurations

** Use NSN 2510-01-252-8461 cover until PN (19207) 57K0298 kit becomes available. The kit includes the PN 12339226-2 cover, NSN 4010-01-194-8546 connector and two NSN 5310-00-814-0673 locknuts.

3-17. Tact. Trucks cont.

PROCEDURE:

A. TAILGATE CHAIN COVER REPLACEMENT.

NOTE

This procedure replaces all tailgate chain covers except the S-250 Shelter configurations on M1037, M1042, M1097, and M1097A1 vehicles.

Proceed to paragraph B, Steps 1 through 19 for replacement procedures pertaining to S-250 Shelter configurations.

The procedure for replacement of left and right tailgate chain covers is basically the same. This procedure replaces left tailgate chain cover.

1. Remove two locknuts (1), washers (2), screws (4), washers (2), reinforcement bracket (6), and tailgate chain assembly (5) from body (3). (see figure 3-77) Discard two locknuts (1).
2. Pry connector (3) apart and remove chain mounting bracket (4) from tailgate chain assembly (1). (see figure 3-78) Discard connector (3).
3. Remove cover (2) from tailgate chain assembly (1).
4. Install P/N 12339226-2 cover (2) on tailgate chain assembly (1).
5. Install NSN 4010-01-194-8546 connector (3) and chain mounting bracket (4) on tailgate chain assembly (1).
6. Install tailgate chain assembly (5) and reinforcement bracket (6) on body (3) with four washers (2), two screws (4), and NSN 5310-00-814-0673 locknuts (1). (see figure 3-77) Tighten locknuts (1) to 24 lb-ft (32 N•m).
7. Spot paint as necessary. (Refer to TM 43-0139.)
8. Repeat steps 1 through 7 for right side tailgate chain cover replacement.

B. TAILGATE CHAIN COVER REPLACEMENT WITH S-250 SHELTER CONFIGURATIONS ON M1037, M1042, M1097, AND M1097A1 VEHICLES.

NOTE

The procedure for replacement of left and right tailgate chain covers is basically the same. This procedure replaces left tailgate chain covers.

1. Remove two locknuts (1), washers (2), screws (4), washers (2), reinforcement bracket (7), and tailgate chain assembly (6) from body (3). (see figure 3-79) Discard locknuts (1).
-
-

3-17. Tact. Trucks cont.

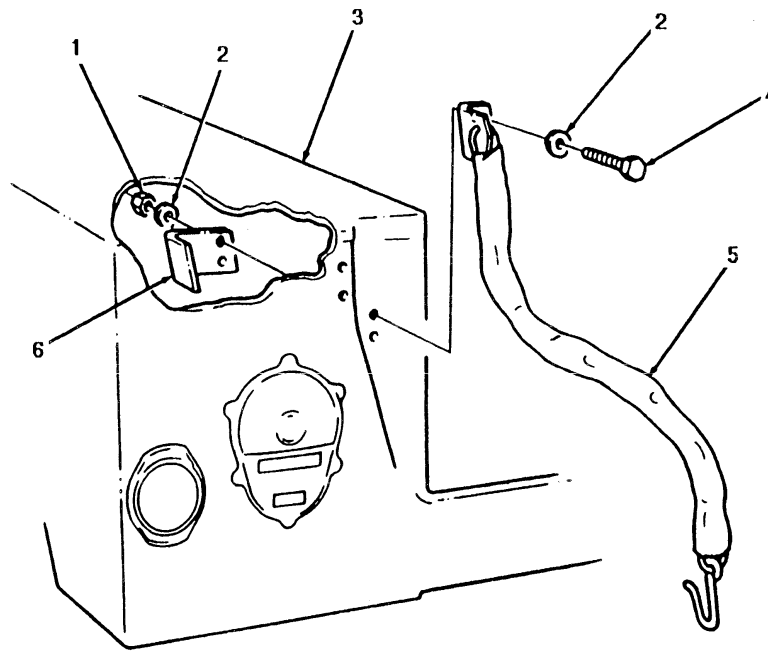
2. Remove two locknuts (1), washers (2), screws (4), washers (2), and tailgate chain assembly (6) from tailgate (5). (see figure 3-79) Discard locknuts (1).
3. Remove hook on tailgate chain assembly (6) from tailgate (5).
4. Pry connector (2) apart and remove chain mounting bracket (1) from tailgate chain assembly (4). (see figure 3-80) Discard connector (2).
5. Remove cover (3) from tailgate chain assembly (4).
6. Pry connector (2) apart on tailgate chain assembly (4) and remove chain with "S" hook (6) attached. Discard connector (2).
7. Remove cover (7) from chain with "S" hook (6) attached.
8. Pry connector (2) apart and remove chain mounting bracket (1) from tailgate chain assembly (4). Discard connector (2).
9. Remove cover (5) from tailgate chain assembly (4).
10. Install NSN 2510-01-252-8461 cover (5) on tailgate chain assembly (4).
11. Install NSN 4010-01-194-8546 connector (2) on tailgate chain assembly (4) and chain mounting bracket (1).
12. Install NSN 2510-01-252-7904 cover (7) on chain with "S" hook (6) attached.
13. Install NSN 4010-01-194-8546 connector (2) on chain with "S" hook (6) attached and tailgate chain assembly (4).
14. Install NSN 2510-01-252-7903 cover (3) on tailgate chain assembly (4).
15. Install NSN 4010-01-194-8546 connector (2) on tailgate chain assembly (4) and chain mounting bracket (1).
16. Install tailgate chain assembly (6) to tailgate (5) with four washers (2), two screws (4), and NSN 5310-00-814-0673 locknuts (1). (see figure 3-79) Tighten locknuts (1) to 15 lb-ft (20 N•m).
17. Install tailgate chain assembly (6) and reinforcement bracket (7) to body (3) with four washers (2), two screws (4), and NSN 5310-00-814-0673 locknuts (1). Tighten locknuts (1) to 24 lb-ft (32 N•m).
18. Spot paint as necessary. (Refer to TM 43-0139.)
19. Repeat steps 1 through 18 for right side tailgate chain cover replacement.

PUBLICATIONS AFFECTED:

TM9-2320-280-20
TM9-2320-280-20P
TM9-2320-280-34P

LEVEL OF MAINTENANCE:

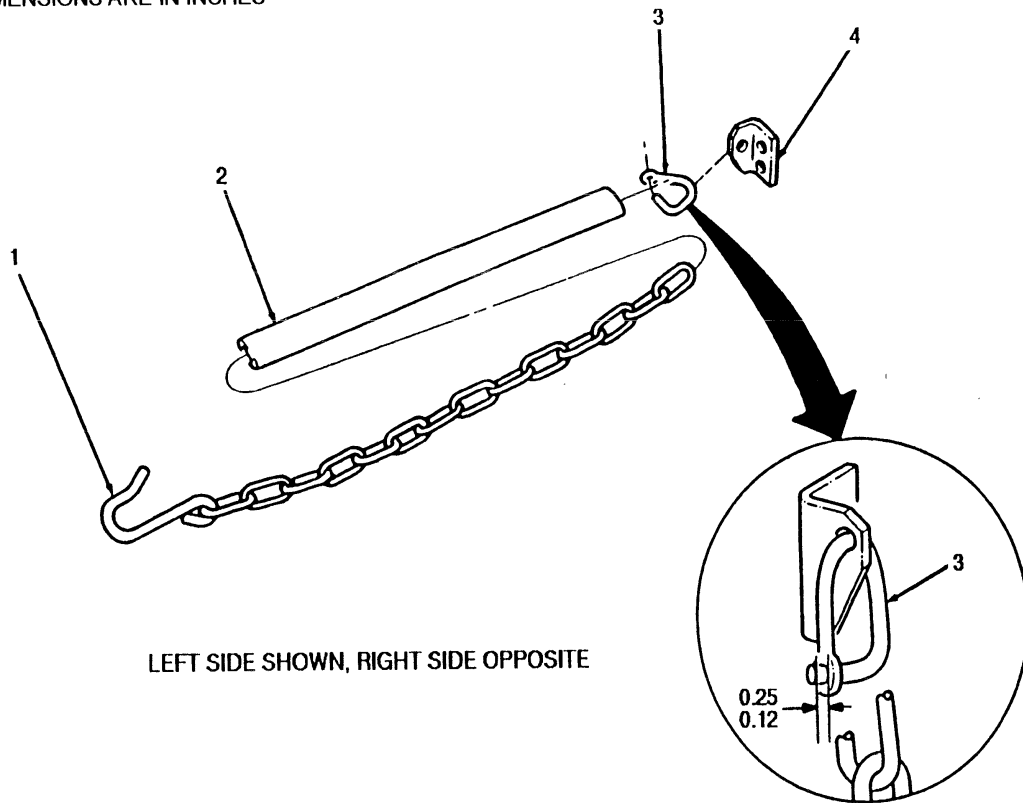
Unit



LEFT SIDE SHOWN, RIGHT SIDE OPPOSITE

FIGURE 3-77

NOTE: ALL DIMENSIONS ARE IN INCHES



LEFT SIDE SHOWN, RIGHT SIDE OPPOSITE

FIGURE 3-78

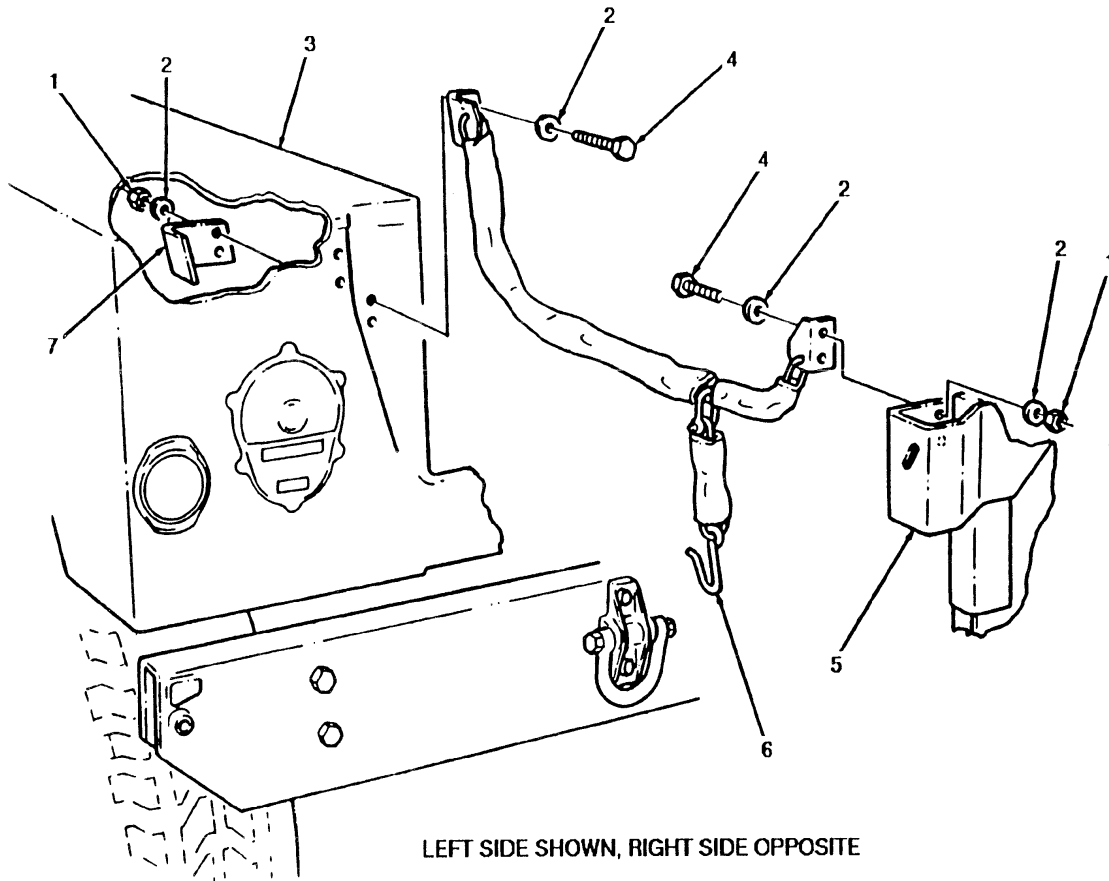
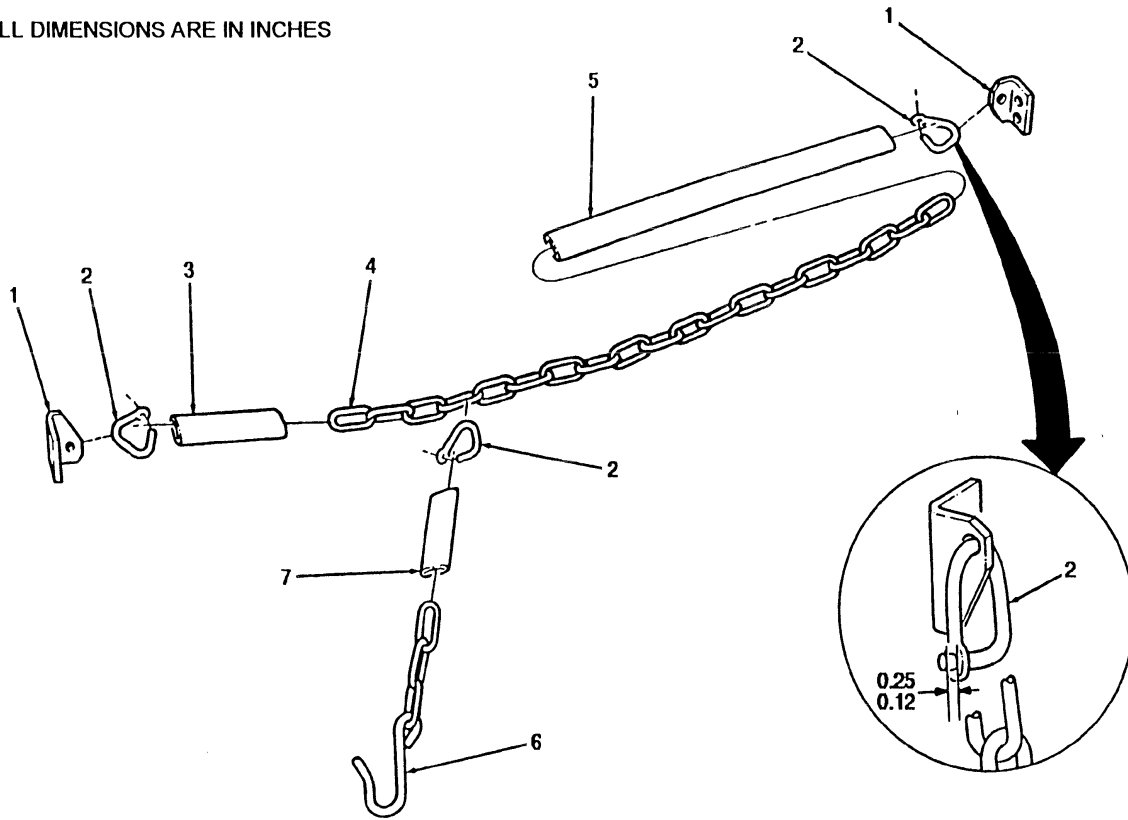


FIGURE 3-79

NOTE: ALL DIMENSIONS ARE IN INCHES



LEFT SIDE SHOWN, RIGHT SIDE OPPOSITE

FIGURE 3-80

8-3. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Tailgate Operation

POC:

Ms. Patricia Grashik, AMSTA-MTA, DSN 786-7427, Commercial (313) 574-7427

DEFICIENCY:

Tailgates are being extended lower than the tailgate chains allow. The tailgate then comes into contact with the lifting shackles. This could cause damage to the tailgate.

COMMENTS:

The tailgate chains are used not only as a securing device when the tailgate is closed, but also as horizontal support when the tailgate is open. Never open the tailgate without using the chains to support it and don't let the tailgate swing freely.

PUBLICATIONS AFFECTED:

TM9-2320-280-10

LEVEL OF MAINTENANCE:

Unit

'3-86

4-7 Tactical Trucks

MODEL:

M996, M996A1, M997, M997A1, and M997A2 HMMWVs

SUBJECT:

Ambulance Rear Step Hand Knob Separates From Step

POC:

Mr. Ron Hanebutt, AMSTA-IM-MTA, DSN 786-7151, Commercial (810) 574-7151

hanebutr@cc.tacom.army.mil

DEFICIENCY:

Reports from the field indicate some of the adjustment hand knobs for the rear step on the ambulance are separating from the step during adjustment and is difficult to reassemble.

COMMENTS:

A procedure has been developed to replace the existing hand knob with a new modified hand knob. A hole is drilled through the end of the new hand knob and a washer and cotter pin is added. The procedure can be accomplished in the field with the following parts and procedures.

MATERIALS/PARTS:

Parts to be requisitioned:

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
5310-00-012-0396	Washer	1
5355-00-161-0643	Knob, Hand	1
5315-01-359-1451	Pin, Cotter	1

PROCEDURES:

1. Locate, mark, and drill a 0.109-inch diameter hole in NSN 5355-00-161-0643 hand knob (1). (see figure 4-1)
2. Install hand knob (4) on rear step (1) with NSN 5310-00-012-0396 washer (3) and NSN 5315-01-359-1451 cotter pin (2). (see figure 4-2)

PUBLICATIONS AFFECTED:

TM9-2320-280-20

TM9-2320-280-20P

TM9-2320-280-34P

LEVEL OF MAINTENANCE:

Unit

NOTE:
ALL DIMENSIONS ARE IN INCHES.

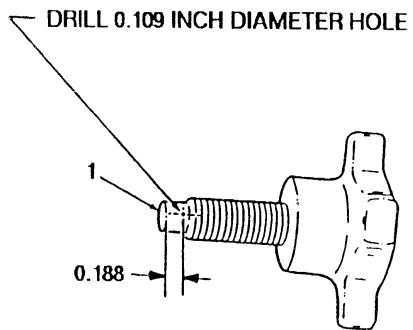


FIGURE 4-1

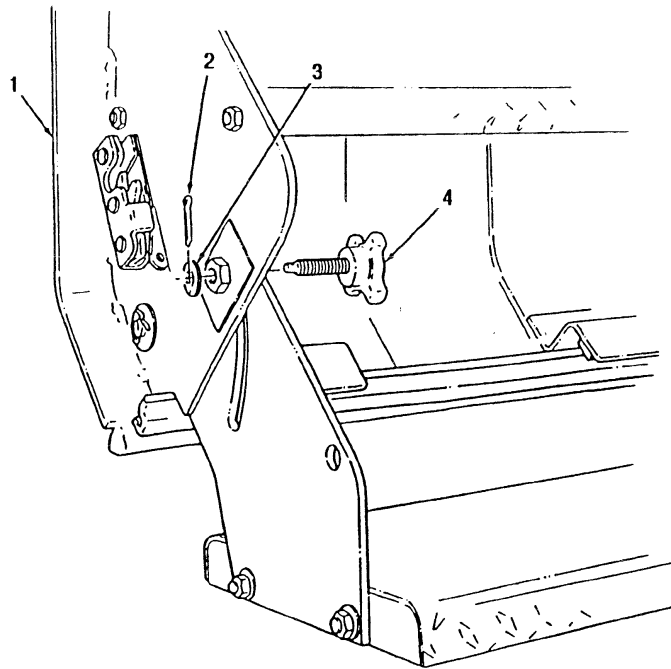


FIGURE 4-2

3-8. Tactical Trucks

MODEL:

M966, M966A1, M996, M996A1, M997, M997A1, M997A2, M1025, M1025A1, M1025A2, M1026, and M1026A1

SUBJECT:

Armored Door Cracks

POC:

Ms. Jody McInerney, AMSTA-IM-HLA, DSN 786-5481, Commercial (810) 574-5481
mcinernj@cc.tacom.army.mil

DEFICIENCY:

Reports from the field indicate the armor doors are cracking due to stress created by the door being pushed open beyond the limits of the door stop, flexing the door and eventually creating a crack.

COMMENTS:

A procedure has been developed to fabricate a reinforcement bracket to mount on the weak area of the door. This bracket should retard further cracking at that location. Fabrication and installation of the bracket can be accomplished in the field using the following materials, parts, and procedure.

MATERIALS/PARTS:

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
5310-01-254-4284	Locknut	4 per door
9515-00-237-1885	Sheet Metal	AR
5305-00-267-8953	Screw	1 per door
5310-00-809-4058	Washer	1 per door

PARTS TO BE FABRICATED:

1. To fabricate door hinge reinforcement bracket for left door, refer to figure 3-8.
2. To fabricate door hinge reinforcement bracket for right door, refer to figure 3-9.
3. Spot-paint fabricated brackets IAW TM 43-0139.

PROCEDURES:

NOTE

This procedure is for top door hinge area cracks only.

3-8. Tact. Trucks cont.

1. Remove door from vehicle (refer to TM9-2320-280-20).
2. Remove door stop bracket and shim, if installed, from inside of door (refer to TM9-2320-280-20).
3. Remove two screws (3) and washers (4) from door latch tube (6) on side rail (5) next to hinge (1). (see figure 3-10)
4. Position door hinge reinforcement bracket (14) between side rail (5) and door latch tube (6) and install two existing screws (3) and washers (4). Do not tighten screws (3).
5. Install door hinge reinforcement bracket (14) to door (15) with three existing screws (16), washers (12), outer and inner shims (2) if removed, door stop bracket (11), three washers (13), and NSN 5310-01-254-4284 locknuts (12).
6. Tighten screws (3) installed in step 4.
7. Drill a 0.281-inch diameter hole in side rail (5) using the existing hole (8) in reinforcement bracket (14) as a guide.
8. Secure door hinge reinforcement bracket (14) to side rail (5) with NSN 5305-00-267-8953 screw (10), NSN 5310-00-809-4058 washer (9), and NSN 5310-01-254-4284 locknut (7).
9. Install door (refer to TM9-2320-280-20).
10. Adjust door (refer to TM9-2320-280-20).

PUBLICATIONS AFFECTED:

TM9-2320-280-20
TM9-2320-280-20P
TM9-2320-280-34P

LEVEL OF MAINTENANCE:

Unit

(2) MATERIAL:

**STEEL, CARBON, SHEET METAL,
HR, CQ, P & O
IAW ASTM A569 0.0747 THICK**

(3) REMOVE ALL BURRS AND SHARP EDGES.



NOTES:

- (1) ALL DIMENSIONS ARE IN INCHES.
- (2) MATERIAL:
STEEL, CARBON, SHEET METAL,
HR, CQ, P & O
IAW ASTM A569 0.0747 THICK
- (3) REMOVE ALL BURRS AND SHARP EDGES.

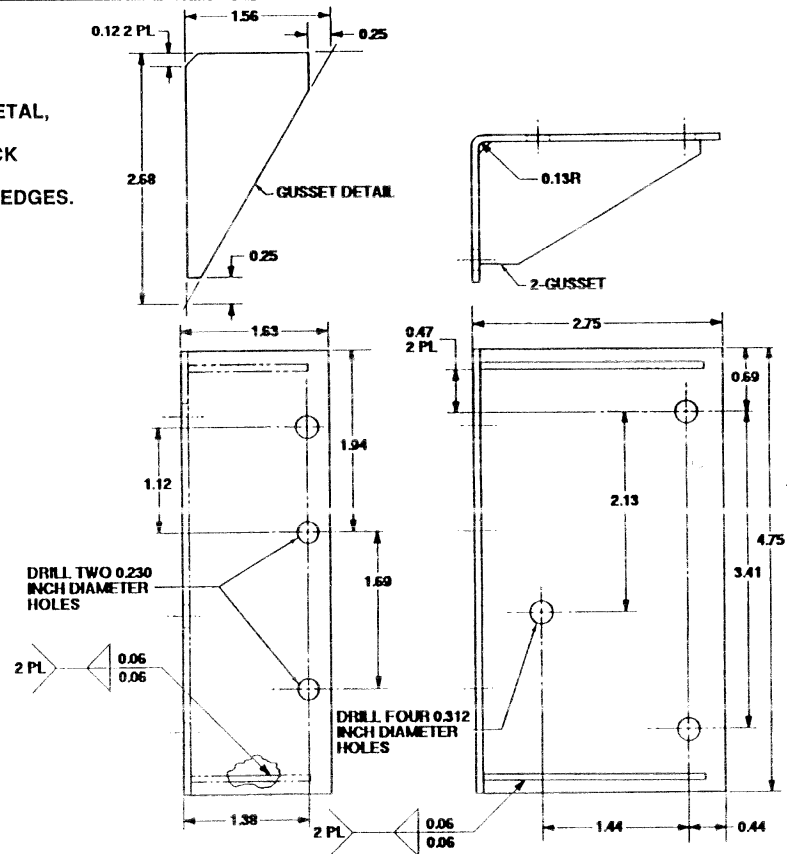


FIGURE 3-9

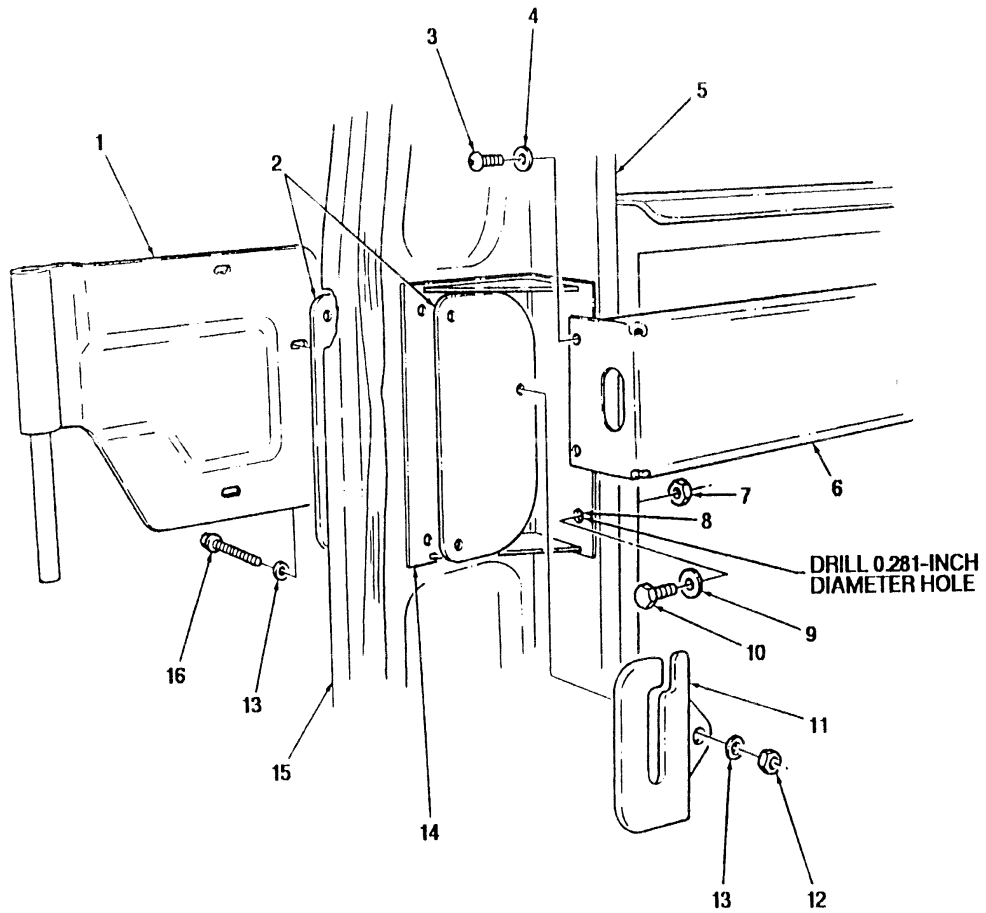


FIGURE 3-10

3-11. Tactical Trucks

MODEL:

HMMWV M996, M996A1, M997, and M997A1 Ambulance

SUBJECT:

Fabrication Instructions for Retainer Brackets, NSN 2510-01-265-1127 and 5340-01-273-1684, used on M996/M997 Ambulance Bulkhead Door.

POC:

Mr. Eddle Bynum, AMSTA-MTA, DSN 786-7346.

DEFICIENCY:

Currently, the HMMWV Technical Manuals (TMs) 9-2320-280-20P & 34P list the subject retainers with a Source Code of PA, stocked for Issue. However, we've changed the Source Code to MF (Fabricate). Here are the instructions.

COMMENTS:

The retainers can be fabricated using Aluminum Alloy 6061-T6, NSN 9535-00-250-6503 which is available in the supply system. These changes will appear in the next change to the HMMWV technical manuals. See Figure 3-6 for the required dimensions, bends and hole.

NOTE

All dimensions are in inches.

Remove all burrs and sharp edges.

Material: Aluminum Alloy 6061-T6, IAW Spec.QQ-A-250/11, .050 thick.

PUBLICATIONS AFFECTED:

TM9-2320-280-20P

TM9-2320-280-34P

LEVEL OF MAINTENANCE:

Direct Support

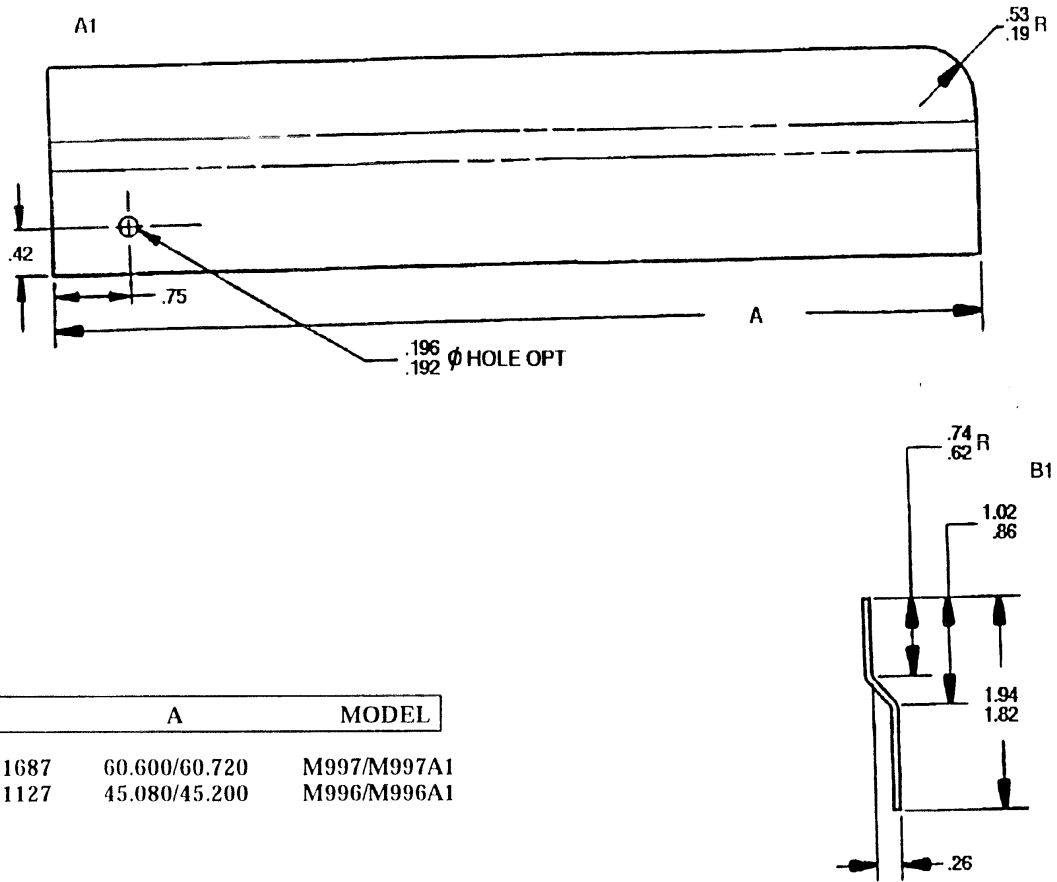


FIGURE 3-6

3-13. Tactical Trucks

MODEL:

HMMWV M997 Ambulance, 1-1/4 Ton, 4x4

SUBJECT:

Ambulance Exterior Body Repair Procedures

POC:

Mr. Eric Sutman, AMSTA-MTA, DSN 786-7151, Commercial (810) 574-7151

DEFICIENCY:

Units lack technical maintenance manual support for repairing the M997 ambulance body.

COMMENTS:

Procurement of replacement parts, removal, and installation maintenance procedures have been developed for replacing exterior panels on the M997 ambulance body. These procedures can be accomplished in the field by using the following materials, replacement parts list, and instruction procedures.

MATERIALS:

<u>NSN or P/N</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
8040-00-938-1535	Adhesive	4
(71961) 6099	Sealant, Wicking	6
8030-01-347-0964	Sealant, Adhesive, Gray, Uniroyal	10

PARTS:

For M997 ambulance body exterior panel section breakdown and parts identification refer to figures 3-18, 3-19, and 3-20.

3-13. Tact. Trucks cont.

<u>ITEM</u>	<u>(CAGE)</u>	<u>P/N OR NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
1.	(19207)	12341177-2	Panel, Roof, Side, Outer	1
2.	(19207)	12341159-1	Support Shield, Heater Exhaust	1
3.	(19207)	12341080-2	Panel, Nose Cap	1
4.	(19207)	12341180	Panel, Nose, Front, R.H.	1
5.	(19207)	12341177-1	Panel, Roof, Side, Outer	1
6.	(19207)	12341179	Panel, Nose, Front, L.H.	1
7.	(19207)	12341080-1	Panel, Nose Cap	1
8.	(19207)	12341598-1	Corner, Body Roof Panel	1
9.	(19207)	12341169	Panel, Roof, Rear	1
10.	(19207)	12341598-2	Corner, Body Roof Panel	1
11.	(19207)	12341071	Reinforcement Assembly	4
12.	(19207)	12341568-2	Corner, Body Side, R.R.	1
13.	(19207)	12341083-2	Panel, Body, Right Rear Lower/Upper	1
14.	(19207)	5340-01-297-4127	Bracket, Tail Lamp Housing	2
15.	(19207)	12341570-2	Panel, Body, Lower	1
16.	(19207)	12341696	Litter Stowage Opening Bracket	1
17.	(19207)	12341083-1	Panel, Body, Left Rear Lower/Upper	1
18.	(19207)	12341570-1	Panel, Body, Lower	1
19.	(19207)	12341568-1	Corner, Body Side, L.R.	1
20.	(19207)	12341040	Rail, Rear Drip	1
21.		5320-01-271-6357	Rivet	300
22.		5320-01-264-5978	Rivet	100
23.		5320-01-136-3562	Rivet	100

REFERENCES:

A. You can use bulk aluminum to make repairs to the ambulance body. Use aluminum with a temper of either T4 or T6 and a thickness of .050". NSNs for bulk aluminum are contained in TM9-2320-280-34, appendix F. For general body repair procedures, refer to TM9-2320-280-34, paragraphs 13-3 through 13-7.

B. For electrical system checks, refer to TM9-2320-280-20.

C. For ambulance body maintenance, refer to TM9-2320-280-20.

3-13. Tact. Trucks cont.

PROCEDURES:

A. LEFT NOSE CAP REPLACEMENT.

1. Scribe two lines centered over each of the seventeen rivet heads (3) on nose cap (1). Extend scribed lines a minimum of 1.00-inch onto body panels (2). (see figures 3-21 and 3-24)
2. Using a 0.187-inch drill, remove seventeen rivets (3) that secure nose cap (1) to body panels (2). (see figure 3-24)
3. Remove nose cap (1).
4. Remove adhesive residue and clean body panels (2). Do not remove scribed lines marked in step 1.
5. Position P/N 12341080-1 nose cap (1) on body panels (2) and transfer scribed lines marked in step 1. Remove nose cap (1).
6. Using scribed lines marked in step 5, drill seventeen 0.187-inch diameter holes in nose cap (1).
7. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to nose cap (1) and body panels (2). (see figures 3-22 and 3-24)
8. Position nose cap (1) on body panels (2) and secure with seventeen NSN 5320-01-271-6357 rivets (4). (see figure 3-24)
9. Apply P/N (71961) 6099 wicking sealant (1) to seventeen rivet heads (3) installed in step 8. (see figures 3-23 and 3-24)
10. Spot paint nose cap (1) and body panels (2). (see figure 3-24) (Refer to TM 43-0139.)

B. LEFT SIDE OUTER ROOF PANEL REPLACEMENT.

1. Remove left nose cap. (Refer to paragraph A.)
2. Scribe two lines centered over each of the forty-seven rivet heads (3) on side outer roof panel (5). Extend scribed lines a minimum of 1.00-inch onto body panels (2). (see figures 3-21 and 3-24)
3. Using a 0.187-inch drill, remove forty-seven rivets (3) that secure side outer roof panel (5) to body panels (2). (see figure 3-24)
4. Remove side outer roof panel (5).
5. Remove adhesive residue and clean body panels (2). Do not remove scribed lines marked in step 2.
6. Position P/N 12341177-1 side outer roof panel (5) on body panels (2) and transfer scribed lines marked in step 2. Remove side outer roof panel (5).
7. Using scribed lines marked in step 6, drill forty-seven 0.187-inch diameter holes in side outer roof panel (5).

3-13. Tact. Trucks cont.

8. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to side outer roof panel (5) and body panels (2). (see figures 3-22 and 3-24)
9. Position side outer roof panel (5) on body panels (2) and secure with forty-seven NSN 5320-01-271-6357 rivets (4). (see figure 3-24)
10. Position nose cap (1) removed in step 1 to body panels (2) and side outer roof panel (5).
11. Using nose cap (1) as a template, drill three 0.187-inch diameter holes marked "A" through roof side outer panel (5). Remove nose cap (1).
12. Install nose cap. (Refer to paragraph A.)
13. Spot paint side outer roof panel (5) and body panels (2). (Refer to TM 43-0139.)
14. Apply P/N (71961) 6099 wicking sealant to forty-seven rivet heads (4) installed in step 9. (see figures 3-23 and 3-24)

C. LEFT FRONT NOSE PANEL REPLACEMENT.

1. Using a 0.125-inch drill, remove three rivets (9) marked "A" that secure side panel (7) to window support (10). (see figure 3-25)
2. Using a 0.187-inch drill, remove twenty-one rivets (3) that secure side panel (7) to window support (10) and body panels (1).
3. Remove side panel (7).
4. Remove adhesive residue and clean side panel (7), window support (10), and body panels (1).
5. Remove left nose cap. (Refer to paragraph A.)
6. Remove left side outer roof panel. (Refer to paragraph B.)
7. Scribe two lines centered over each of the thirteen rivet heads (3) on front nose panel (5). Extend scribed lines a minimum of 1.00-inch onto body panels (1). (see figures 3-21 and 3-25)
8. Using a 0.187-inch drill, remove thirteen rivets (3) that secure front nose panel (5) to body panels (1). (see figure 3-25)
9. Remove front nose panel (5).
10. Remove adhesive residue and clean body panels (1). Do not remove scribed lines marked in step 7.
11. Position P/N 12341179 front nose panel (5) to body panels (1) and transfer scribed lines marked in step 7. Remove front nose panel (5).
12. Using scribed lines marked in step 11, drill thirteen 0.187-inch diameter holes in front nose panel (5).
13. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to front nose panel (5) and body panels (1). (see figures 3-22 and 3-25)

3-13. Tact. Trucks cont.

14. Position front nose panel (5) on body panels (1) and secure with thirteen NSN 5320-01-271-6357 rivets (2). (see figure 3-25)
15. Position side outer roof panel (6) removed in step 6 to body panels (1) and front nose panel (5).
16. Using side outer roof panel (6) as a template, drill seventeen 0.187-inch diameter holes marked "B" through front nose panel (5). Remove side outer roof panel (6).
17. Install side outer roof panel. (Refer to paragraph B.)
18. Position nose cap (4) removed in step 5 to body panels (1), front nose panel (5), and side outer roof panel (6).
19. Using nose cap (4) as a template, drill nine 0.187-inch diameter holes marked "C" through front nose panel (5) and side outer roof panel (6). Remove nose cap (4).
20. Install nose cap. (Refer to paragraph A.)
21. Apply P/N (71961) 6099 wicking sealant to thirteen rivet heads (2) installed in step 14. (see figures 3-23 and 3-25)
22. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to side panel (7) window support (10), and body panels (1). (see figures 3-22 and 3-25)
23. Position existing side panel (7) to window support (10) and body panels (1) and secure with three NSN 5320-01-136-3562 rivets (8). (see figure 3-25)
24. Secure side panel (7) to front nose panel (5) and body panels (1) with twenty-one NSN 5320-01-271-6357 rivets (2).
25. Spot paint side panel (7), front nose panel (5), and body panels (1). (Refer to TM 43-0139.)
26. Apply P/N (71961) 6099 wicking sealant to twenty-four rivet heads (2) installed in steps 23 and 24. (see figures 3-23 and 3-25)

D. RIGHT NOSE CAP REPLACEMENT.

1. Scribe two lines centered over each of the seventeen rivet heads (11) on nose cap (9). Extend scribed lines a minimum of 1.00-inch onto body panels (10). (see figures 3-21 and 3-26)
2. Using a 0.187-inch drill, remove seventeen rivets (11) that secure nose cap (9) and body panels (10). (see figure 3-26)
3. Remove nose cap (9).
4. Remove adhesive residue and clean body panels (10). Do not remove scribed lines marked in step 1.
5. Position P/N 12341080-2 nose cap (9) on body panels (10) and transfer scribed lines marked in step 1. Remove nose cap (9).
6. Using scribed lines marked in step 5, drill seventeen 0.187-inch diameter holes in nose cap (9).

3-13. Tact. Trucks cont.

7. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to nose cap (9) and body panels (10). (see figures 3-22 and 3-26)
8. Position nose cap (9) on body panels (10) and secure with seventeen NSN 5320-01-271-6357 rivets (12). (see figure 3-26)
9. Spot paint nose cap (9) and body panels (10). (Refer to TM 43-0139.)
10. Apply P/N (71961) 6099 wicking sealant to seventeen rivet heads (12) installed in step 8. (see figures 3-23 and 3-26)

E. RIGHT SIDE OUTER ROOF PANEL REPLACEMENT.

1. Remove right nose cap. (Refer to paragraph D.)
2. Remove bolt (5) and washer (3) securing air conditioning support bracket (4) to side outer roof panel (1). (see figure 3-26)
3. Remove heater exhaust tube. (Refer to TM9-2320-280-20.)
4. Scribe two lines centered over each of the eighteen rivet heads (7) on side outer roof panel (1). Extend scribed lines a minimum of 1.00-inch onto body panels (8). (see figures 3-21 and 3-26)
5. Using a 0.187-inch drill, remove eighteen rivets (7) that secure heater exhaust support shield (2) to side outer roof panel (1) and body panel (8). (see figure 3-26)
6. Remove heater exhaust support shield (2).
7. Remove adhesive residue and clean side outer roof panel (1) and body panel (8). Do not remove scribed lines marked in step 4.
8. Position P/N 12341159-1 heater exhaust support shield (2) to side outer roof panel (1) and body panel (8). Transfer scribed lines marked in step 4. Remove heater exhaust support shield (2).
9. Using scribed lines marked in step 8, drill eighteen 0.187-inch diameter holes in heater exhaust support shield (2).
10. Scribe two lines centered over each of the twenty rivet heads (7) on side outer roof panel (1). Extend scribed lines a minimum of 1.00-inch onto body panels (8). (see figures 3-21 and 3-26)
11. Using a 0.187-inch drill, remove twenty rivets (7) that secure side outer roof panel (1) to body panels (8). (see figure 3-26)
12. Remove side roof outer panel (1).
13. Remove adhesive residue and clean body panels (8). Do not remove scribed lines marked in steps 4 and 10.
14. Position P/N 12341177-2 side outer roof panel (1) to body panels (8) and transfer scribed lines marked in step 10. Remove side outer roof panel (1).
15. Using scribed lines marked in step 14, drill twenty 0.187-inch diameter holes in side outer roof panel (1).

3-13. Tact. Trucks cont.

16. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to side outer roof panel (1) and body panels (8). (see figures 3-22 and 3-26)
17. Install side outer roof panel (1) to body panels (8) and secure with twenty NSN 5320-01-271-6357 rivets (6). (see figure 3-26)
18. Position nose cap (9) removed in step 1 to body panels (8) and side outer roof panel (1).
19. Using nose cap (9) as a template, drill three 0.187-inch diameter holes marked "A" through side outer roof panel (1). Remove nose cap (9).
20. Install nose cap. (Refer to paragraph D.)
21. Install existing washer (3) and bolt (5) to side outer roof panel (1) and air conditioner support bracket (4).
22. Position heater exhaust support shield (2) removed in step 8 to side outer roof panel (1) and body panels (8).
23. Using heater exhaust support shield (2) as a template, drill eighteen holes marked "B" through side outer roof panel (1) and body panels (8). Remove heater exhaust support shield (2).
24. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to heater exhaust support shield (2), side outer roof panel (1) and body panel (8). (see figures 3-22 and 3-26)
25. Position heater exhaust support shield (2) to side outer roof panel (1) and body panel (8) and secure with eighteen 5320-01-264-5978 rivets (6). (see figure 3-26)
26. Install heater exhaust tube. (Refer to TM9-2320-280-20.)
27. Spot paint side outer roof panel (1), heater exhaust support shield (2) and body panels (8). (Refer to TM 43-0139.)
28. Apply P/N (71961) 6099 wicking sealant to thirty-eight rivet heads (6) installed in steps 17 and 25. (see figure 3-23 and 3-26)

F. RIGHT FRONT NOSE PANEL REPLACEMENT.

1. Using a 0.125-inch drill, remove three rivets (7) that secure side panel (8) to window support (12). (see figure 3-27)
 2. Using a 0.187-inch drill, remove twenty-one rivets (3) that secure side panel (8) to window support (12) and body panels (13).
 3. Remove side panel (8).
 4. Remove adhesive residue and clean window support (12) and body panels (8).
 5. Remove right nose cap. (Refer to paragraph D.)
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3-13. Tact. Trucks cont.

6. Remove right side outer roof panel. (Refer to paragraph E.)
7. Scribe two lines centered over each of the thirteen rivet heads (3) on front nose panel (1). Extend scribed lines a minimum of 1.00-inch onto body panels (13). (see figures 3-21 and 3-27)
8. Using a 0.187 inch drill, remove thirteen rivets (3) that secure front nose panel (1) to body panels (13). (see figure 3-27)
9. Remove four bolts (10) and washers (9) securing heater support bracket (11) to front nose panel (1).
10. Remove front nose panel (1).
11. Remove adhesive residue and clean body panels (13). Do not remove scribed lines marked in step 7.
12. Position 12341180 front nose panel (1) to body panels (13) and transfer scribed lines marked in step 7. Remove nose panel (1).
13. Using scribed lines marked in step 12, drill thirteen 0.187-inch diameter holes in front nose panel (1).
14. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to front nose panel (1) and body panels (13). (see figures 3-22 and 3-27)
15. Position front nose panel (1) on body panels (13) and secure with thirteen NSN 5320-01-271-6357 rivets (2). (see figure 3-27)
16. Install existing four washers (9) and bolts (10) to front nose panel (1) and heater support bracket (11).
17. Position side outer roof panel (4) removed in step 6 to body panels (13) and front nose panel (1).
18. Using side outer roof panel (4) as a template, drill seventeen 0.187-inch diameter holes marked "C" through front nose panel (1). Remove side outer roof panel (4).
19. Install side outer roof panel. (Refer to paragraph E.)
20. Position nose cap (5) removed in step 5 to body panels (13), side outer roof panel (4), and nose panel (1).
21. Using nose cap (5) as a template, drill nine 0.187-inch diameter holes marked "B" through side outer roof panel (4) and nose panel (1). Remove nose cap (5).
22. Install nose cap. (Refer to paragraph D.)
23. Apply P/N (71961) 6099 wicking sealant to thirteen rivet heads (2) installed in step 15. (see figures 3-23 and 3-27)
24. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to side panel (8), window support (12), and body panels (13). (see figures 3-22 and 3-27)
25. Position existing side panel (8) to window support (12) and body panels (13) and secure with three NSN 5320-01-136-3562 rivets (6). (see figure 3-27)

3-13. Tact. Trucks cont.

26. Secure side panel (8) to front nose panel (1) and body panels (13) with twenty-one NSN 5320-01-271-6357 rivets (2). (see figure 3-27)
27. Apply P/N (71961) 6099 wicking sealant to twenty-four rivet heads (2) and (6) installed in steps 25 and 26. (see figures 3-23 and 3-27)
28. Spot paint side panel (8), front nose panel (1), side outer roof panel (4), nose cap (5), and body panels (13). (see figure 3-27) (Refer to TM 43-0139.)

G. LEFT REAR CORNER ROOF PANEL REPLACEMENT.

1. Remove door weatherstrip. (Refer to TM9-2320-280-20.)
2. Scribe two lines (2) centered over each of the fifteen rivet heads (3) and (5) on rear corner roof panel (4) and body panels (1). Extend scribed lines a minimum of 1.00-inch onto body panels (1). (see figures 3-21 and 3-28)
3. Using a 0.125-inch drill, remove three rivets (5) that secure rear corner roof panel (4) to body panels (1). (see figure 3-28)
4. Using a 0.187-inch drill, remove twelve rivets (3) that secure rear corner roof panel (4) to body panels (1). Remove rear corner roof panel (4).
5. Remove adhesive residue and clean body panels (1). Do not remove scribed lines marked in step 2.
6. Position P/N 12341598-1 rear corner roof panel (4) to body panels (1) and transfer scribed lines marked in step 2. Remove rear corner roof panel (4).
7. Using scribed lines marked in step 6, drill three 0.125-inch diameter holes in rear corner roof panel (4) (for rivets (6) installation).
8. Using scribed lines marked in step 6, drill twelve 0.187-inch diameter holes in rear corner roof panel (4) (for rivets (2) installation).
9. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to rear corner roof panel (4) and body panels (1). (see figures 3-22 and 3-28)
10. Position rear corner roof panel (4) to body panels (1) and secure with three NSN 5320-01-136-3562 rivets (6) and twelve NSN 5320-01-271-6357 rivets (2). (see figure 3-28)
11. Spot paint rear corner roof panel (4) and body panels (1). (Refer to TM 43-0139.)
12. Apply P/N (71961) 6099 wicking sealant to twelve rivet heads (2) installed in step 10. (see figures 3-23 and 3-28)

H. REAR ROOF PANEL REPLACEMENT.

1. Remove door weatherstrip. (Refer to TM9-2320-280-20.)
 2. Remove left rear corner roof panel. (Refer to paragraph G.)
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3-13. Tact. Trucks cont.

3. Scribe two lines centered over rivet head (10) marked "B" that secures drip rail (7) to right rear corner roof panel (6) extend scribed lines a minimum of 1.00-inch onto right rear corner roof panel (6). (see figures 3-21 and 3-29)
4. Using a 0.187-inch drill, remove rivet (10) marked "B" that secures drip rail (7) to right rear corner roof panel (6). (see figure 3-29)
5. Scribe two lines centered over each of the twenty-seven rivet heads (3) onto rear roof panel (12). Extend scribed lines a minimum of 1.00-inch onto body panels (1). (see figures 3-21 and 3-29)
6. Using a 0.125-inch drill, remove twelve rivets (9) that secure rear roof panel (12) to body panels (1). (see figure 3-29)
7. Using a 0.187-inch drill, remove fifteen rivets (3) that secure rear roof panel (12) to body panels (1).

NOTE

Ten rivets that secure rear roof panel to horizontal support braces are not visible because they are covered by body panels.

8. Separate body panels (1) from rear roof panel (12). (see figure 3-29)
 9. Transfer ten rivet head (5) locations marked "A" onto exterior side of body panels (1); center punch locations marked "A".
 10. Drill ten 0.125-inch diameter pilot holes through body panels (1) marked in step 9.
 11. Using a 0.187-inch drill, remove ten rivets (5) marked "A" in steps 9 and 10.
 12. Remove rear roof panel (12).
 13. Remove adhesive residue and clean body panels (1). Do not remove scribed lines marked in steps 3, 5, and 9.
 14. Position P/N 12341169 rear roof panel (12) to body panels (1) and transfer scribed lines marked in steps 3, 5, and 9. (see figures 3-21 and 3-29) Remove rear roof panel (12).
 15. Using scribed lines marked in step 14, drill twelve 0.125-inch diameter holes in rear roof panel (12) (for rivets (8) installation). (see figure 3-29)
 16. Using scribed lines marked in step 14, drill twenty-five 0.187-inch diameter holes in rear roof panel (12) (for rivets (2) and (4) installation).
 17. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to rear roof panel (12) and body panels (1). (see figures 3-22 and 3-29)
 18. Position rear roof panel (12) to body panels (1) and secure with twelve NSN 5320-01-136-3562 rivets (8), ten NSN 5320-01-264-5978 rivets (4), and fifteen NSN 5320-01-271-6357 rivets (2). (see figure 3-29)
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19. Install left rear corner roof panel. (Refer to paragraph G.)
20. Using P/N 12341040 rear drip rail (7), locate, mark, and drill nine 0.187-inch diameter holes in rear drip rail (7). (see figure 3-29)
21. Position rear drip rail (7) to holes marked "B" on rear corner roof panels (6). Using rear drip rail (7) as a template, transfer seven hole locations onto rear roof panel (12). Remove rear drip rail (7).
22. Drill seven 0.187-inch diameter holes marked in step 21.
23. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to rear drip rail (7) and rear roof panel (12). (see figures 3-22 and 3-29)
24. Position rear drip rail (7) to rear roof panel (12) and secure with nine NSN 5320-01-271-6357 rivets (11). (see figure 3-29)
25. Spot paint rear roof panel (12), rear corner roof panels (6), rear drip rail (7), and body panels (1). (Refer to TM 43-0139.)
26. Apply P/N (71961) 6099 wicking sealant to rivet heads (2), (4), and (11) installed in steps 18 and 24. (see figures 3-23 and 3-29)
27. Install door weatherstrip. (Refer to TM9-2320-280-20.)

I. LEFT LOWER BODY PANEL REPLACEMENT.

1. Remove door weatherstrip. (Refer to TM9-2320-280-20.)
 2. Disconnect battery ground cable. (Refer to TM9-2320-280-20.)
 3. Remove backup light assembly. (Refer to TM9-2320-280-20.)
 4. Remove tail lamp assembly. (Refer to TM9-2320-280-20.)
 5. Scribe two lines centered over each of the thirteen rivet heads (3) on tail lamp housing bracket (2). Extend scribed lines a minimum of 1.00-inch onto body panels (1). (see figures 3-21 and 3-30)
 6. Using a 0.187-inch drill, remove thirteen rivets (3) that secure tail lamp housing bracket (2) to body panels (1). (see figure 3-30) Remove tail lamp housing bracket (2).
 7. Remove adhesive residue and clean body panels (1). Do not remove scribed lines marked in step 5.
 8. Position NSN 5340-01-297-4127 tail lamp housing bracket (2) to body panels (1) and transfer scribed lines marked in step 5. Remove tail lamp housing bracket (2).
 9. Using scribed lines marked in step 8, drill thirteen 0.187-inch diameter holes in tail lamp housing bracket (2).
 10. Remove litter stowage door. (Refer to TM9-2320-280-20.)
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3-13. Tact. Trucks cont.

11. Scribe two lines centered over each of the sixty-seven rivet heads (3) and (5) on body lower panel (7). Extend scribed lines (2) a minimum of 1.00-inch onto body panels (1). (see figures 3-21 and 3-30)
12. Using a 0.125-inch drill, remove eight rivets (5) that secure lower body panel (7) to body panels (1). (see figure 3-30)
13. Using a 0.187-inch drill, remove fifty-nine rivets (3) that secure lower body panel (7) to body panels (1).
14. Remove lower body panel (7).
15. Remove adhesive residue and clean body panels (1). Do not remove scribed lines marked in step 11.
16. Remove nineteen rivets (3) securing litter stowage opening bracket (8) to lower body panel (7).
17. Position P/N 12341570-1 lower body panel (7) to body panels (1) and transfer scribed lines marked in step 11 onto lower body panel (7). Remove lower body panel (7).
18. Using scribed lines marked in step 17, drill seven 0.125-inch diameter holes in lower body panel (7) (for rivets (6) installation).
19. Using scribed lines marked in step 17, drill fifty-nine 0.187-inch diameter holes in lower body panel (7) (for rivets (4) and (9) installation).
20. Using lower body panel (7) removed in step 14 as a template, position P/N 12341696 litter stowage opening bracket (8) to mount holes marked "A", locate, and mark twenty-three mount holes marked "A" onto litter stowage opening bracket (7). Remove litter stowage bracket (8).
21. Drill twenty-three 0.187-inch diameter holes in litter stowage opening bracket (8) marked in step 20.
22. Align mount holes marked "A" on litter stowage opening bracket (8) to replacement lower body panel (7).
23. Using litter stowage opening bracket (8) as a template, locate, and drill eleven 0.187-inch diameter holes in body lower panel (7). Remove litter stowage opening bracket (8).
24. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to litter stowage opening bracket (8) and lower body panel (1) surface. (see figures 3-22 and 3-30)
25. Position litter stowage opening bracket (8) to lower body panel (7) mount holes marked "B" and secure with eleven NSN 5320-01-271-6357 rivets (4). (see figure 3-30)
26. Install litter stowage door. (Refer to TM9-2320-280-20.)
27. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to lower body panel (7), litter stowage opening bracket (8), and body panels (1). (see figures 3-22 and 3-30)

28. Position lower body panel (7) to body panels (1) and secure with eight NSN 5320-01-136-3562 rivets (6), sixteen 5320-01-264-5978 rivets (9), and forty-one NSN 5320-01-271-6357 rivets (4). (see figure 3-30)
29. Position tail lamp housing bracket (2) to lower body panel (7) and body panels (1).
30. Using tail lamp housing bracket (2) as a template, locate, mark, and drill thirteen 0.187-inch diameter holes in lower body panel (7) and body panels (1). Remove tail lamp housing bracket (2).
31. Apply approximately 0.125-inch thickness of NSN 8040-00-938-1535 adhesive to tail lamp housing bracket (2), lower body panel (7), and body panels (1). (see figures 3-22 and 3-30)
32. Position tail lamp housing bracket (2) to lower body panel (7) and body panels (1) and secure with thirteen NSN 5320-01-271-6357 rivets (4). (see figure 3-30)
33. Spot paint tail lamp housing bracket (5), litter stowage opening bracket (8), lower body panel (7), and body panels (1). (Refer to TM 43-0139.)
34. Apply P/N (71961) 6099 wicking sealant to eighty-one rivet heads (4) and (9) installed in steps 25, 28, and 32. (see figures 3-23 and 3-30)
35. Install tail lamp assembly. (Refer to TM9-2320-280-20.)
36. Install backup light assembly. (Refer to TM9-2320-280-20.)
37. Install battery ground cable. (Refer to TM9-2320-280-20.)
38. Install door weatherstrip. (Refer to TM9-2320-280-20.)

J. LEFT REAR LOWER/UPPER BODY PANEL REPLACEMENT.

1. Remove door weatherstrip. (Refer to TM9-2320-280-20.)
2. Scribe two lines centered over each of the twenty-one rivet heads (2) on rear lower/upper body panel (4). Extend scribed lines a minimum of 1.00-inch onto body panels (1). (see figures 3-21 and 3-31)
3. Using a 0.125-inch drill, remove ten rivets (2) that secure rear lower/upper body panel (4) to body panels (1). (see figure 3-31)
4. Using a 0.187-inch drill, remove eleven rivets (6) that secure rear lower/upper body panel (4) to body panels (1).
5. Remove rear lower/upper body panel (4).
6. Remove adhesive residue and clean body panels (1). Do not remove scribed lines marked in step 2.
7. Position 12341083-1 rear lower/upper body panel (4) to body panels (1) and transfer scribed lines marked in step 2. Remove rear lower/upper body panel (4).

3-13. Tact. Trucks cont.

8. Using scribed lines marked in step 7, drill ten 0.125-inch diameter holes in rear lower/upper body panel (4) (for rivets (3) installation). (see figure 3-31)
9. Using scribed lines marked in step 7, drill eleven 0.187-inch diameter holes in rear lower/upper body panel (4) (for rivets (6) installation).
10. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to rear lower/upper body panel (4) and body panels (1). (see figures 3-22 and 3-31)
11. Install rear lower/upper body panel (4) to body panels (1) and secure with ten NSN 5320-01-136-3562 rivets (3) and eleven NSN 5320-01-271-6357 rivets (5). (see figure 3-31)
12. Spot paint rear lower upper body panel (4) and body panels (1). (Refer to TM 43-0139.)
13. Apply P/N (71961) 6099 wicking sealant to eleven rivet heads (5) installed in step 11. (see figures 3-23 and 3-31)
14. Install door weatherstrip. (Refer to TM9-2320-280-20.)

K. LEFT REAR SIDE CORNER BODY PANEL REPLACEMENT.

1. Remove door weatherstrip. (Refer to TM9-2320-280-20.)
2. Remove left rear door assembly. (Refer to TM9-2320-280-20.)
3. Remove rear hinge assemblies. (Refer to TM9-2320-280-20.)
4. Remove left rear lower/upper body panel. (Refer to paragraph J.)
5. Scribe two lines centered over each of the seventeen rivet heads (3) and (4) on rear side corner body panel (2). Extend scribed lines a minimum of 1.00-inch onto body panels (1). (see figures 3-21 and 3-33)
6. Using a 0.125-inch drill, remove seven rivets (3) that secure rear side corner body panel (2) to body panels (1). (see figure 3-33)
7. Using a 0.187-inch drill, remove ten rivets (4) that secure rear side corner body panel (2) to body panels (1).

NOTE

Five rivets that secure rear side corner body panel to vertical support braces are not visible because they are covered by body panels.

8. Separate body panel (1) from rear side corner body panel (2). (see figure 3-33)
9. Transfer five rivet head (5) locations marked "A" onto exterior side of body panels (1); center punch locations marked "A".
10. Drill five 0.125-inch diameter pilot holes through body panel (1) marked in step 9.
11. Using a 0.187-inch diameter drill, remove five rivets (5) marked in steps 9 and 10.

3-13. Tact. Trucks cont.

12. Remove rear side corner body panel (2). (see figure 3-33)
13. Remove adhesive residue and clean body panels (1). Do not remove scribed lines marked in steps 5. and 9.
14. Using P/N 12341568-1 rear side corner body panel (2) locate, mark, and drill eight 0.187-inch diameter holes in rear side corner body panel (2). (see figure 3-34)
15. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to two reinforcement assemblies (1) and rear side corner body panel (2). (see figures 3-22 and 3-34)
16. Position two P/N 12341071 reinforcement assemblies (1) in rear side corner body panel (2) and secure with existing two rear hinge assemblies (6), eight washers (4), and screws (5). (see figure 3-34)
17. Using holes drilled in step 14 on rear side corner body panel (2) as templates, drill eight 0.187-inch diameter holes through two reinforcement assemblies (1).
18. Secure rear side corner body panel (2) and two reinforcement assemblies (1) together with eight NSN 5320-01-271-6357 rivets (3).
19. Remove eight screws (5), washers (4) and two rear hinge assemblies (6) installed in step 16.
20. Position rear side corner body panel (2) to body panels (1) and transfer scribed lines marked in steps 7 and 9. (see figure 3-33) Remove rear side body panel (2).
21. Using scribed lines marked in step 20, drill seven 0.125-inch diameter holes in rear side corner body panel (2).
22. Using scribed lines marked in step 20, drill twenty-two 0.187-inch diameter holes in rear side corner body panel (2).
23. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to rear side corner body panel (2) and body panels (1). (see figures 3-22 and 3-33)
24. Install rear side corner body panel (2) to body panels (1) and secure with seven NSN 5320-01-136-3562 rivets (6), five NSN 5320-01-264-5978 rivets (8), and seventeen NSN 5320-01-271-6357 rivets (7). (see figure 3-33)
25. Install left rear lower/upper body panel. (Refer to paragraph J.)
26. Spot paint rear side corner body panel (2) and body panels (1). (Refer to TM 43-0139.)
27. Apply P/N (71961) 6099 wicking sealant (1) to thirty-seven rivet heads (7) and (8) installed in steps 18 and 24. (see figures 3-23, 3-33 and 3-34)
28. Install rear hinge assemblies. (Refer to TM9-2320-280-20.)
29. Install left rear door assembly. (Refer to TM9-2320-280-20.)
30. Install door weatherstrip. (Refer to TM9-2320-280-20.)

3-13. Tact. Trucks cont.

L. RIGHT REAR CORNER ROOF PANEL REPLACEMENT.

1. Remove door weatherstrip. (Refer to TM9-2320-280-20.)
2. Scribe two lines centered over each of the fifteen rivet heads (2) and (6) on rear corner roof panel (1) and body panels (4). Extend scribed lines a minimum of 1.00-inch onto body panels (4). (see figures 3-21 and 3-35)
3. Using a 0.125-inch drill, remove three rivets (6) that secure rear roof corner roof panel (1) to body panels (4). (see figure 3-35)
4. Using a 0.187-inch drill, remove twelve rivets (2) that secure rear corner roof panel (1) to body panels (4). Remove rear corner roof panel (1).
5. Remove adhesive residue and clean body panels (4). Do not remove scribed lines marked in step 2.
6. Position P/N 12341598-2 rear corner roof panel (1) to body panels (4) and transfer scribed lines marked in step 2. Remove rear corner roof panel (1).
7. Using scribed lines marked in step 6, drill three 0.125-inch diameter holes in rear corner roof panel (1).
8. Using scribed lines marked in step 6, drill eleven 0.187-inch diameter holes in rear corner roof panel (1).
9. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to rear corner roof panel (1) and body panels (4). (see figures 3-22 and 3-35)
10. Position rear corner roof panel (1) to body panels (4) and secure with three NSN 5320-01-136-3562 rivets (5) and twelve NSN 5320-01-271-6357 rivets (3). (see figure 3-35)
11. Spot paint rear corner roof panel (1) and body panels (4). (Refer to TM 43-0139.)
12. Apply P/N (71961) 6099 wicking sealant to twelve rivet heads (3) installed in step 10. (see figures 3-23 and 3-35)
13. Install door weatherstrip. (Refer to TM9-2320-280-20.)

M. RIGHT LOWER BODY PANEL REPLACEMENT.

1. Remove door weatherstrip. (Refer to TM9-2320-280-20.)
2. Disconnect battery ground cable. (Refer to TM9-2320-280-20.)
3. Remove backup light assembly. (Refer to TM9-2320-280-20.)
4. Remove tail lamp assembly. (Refer to TM9-2320-280-20.)
5. Scribe two lines centered over each of the thirteen rivets (5) on tail lamp housing bracket (6). Extend scribed lines a minimum of 1.00-inch onto body panels (8). (see figures 3-21 and 3-36)

3-13. Tact. Trucks cont.

6. Using a 0.187-inch drill, remove thirteen rivets (5) that secure tail lamp housing bracket (6) to body panels (1). (see figure 3-36) Remove tail lamp housing bracket (6).
7. Remove adhesive residue and clean body panels (1). Do not remove scribed lines marked in step 5.
8. Position NSN 5340-01-297-4127 tail lamp housing bracket (6) to body panels (1) and transfer scribed lines marked in step 5. Remove tail lamp housing bracket (6).
9. Using scribed lines marked in step 8, drill thirteen 0.187-inch diameter holes in tail lamp housing bracket (6).
10. Scribe two lines (2) centered over each of the fifty-three rivet heads (2) and (5) on lower body panel (8). Extend scribed lines a minimum of 1.00-inch onto body panels (1). (see figures 3-21 and 3-36)
11. Using a 0.125-inch drill, remove eight rivets (2) that secure lower body panel (8) to body panels (1). (see figure 3-36)
12. Using a 0.187-inch drill, remove forty-five rivets (5) that secure lower body panel (8) to body panels (1).
13. Remove adhesive residue and clean body panels (1). Do not remove scribed lines marked in step 10.
14. Position 12341570-2 lower body panel (8) to body panels (1) and transfer scribed lines marked in step 10. Remove lower body panel (8).
15. Using scribed lines marked in step 14, drill eight 0.125-inch diameter holes in body lower panel (8).
16. Using scribed lines marked in step 14, drill forty-five 0.187-inch diameter holes in body lower panel (8).
17. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to lower body panel (8) and body panels (1). (see figures 3-22 and 3-36)
18. Position lower body panel (8) to body panels (1) and secure with eight 5320-01-136-3562 rivets (3), sixteen NSN 5320-01-264-5978 rivets (7), and twenty nine NSN 5320-01-271-6357 rivets (4). (see figure 3-36)
19. Position tail lamp housing bracket (6) to lower body panel (8) and body panels (1).
20. Using tail lamp housing bracket (6) as a template, locate, mark, and drill thirteen 0.187-inch diameter holes in lower body panel (8) and body panels (1). Remove tail lamp housing bracket (6).
21. Apply approximately 0.125-inch thickness of NSN 8040-00-938-1535 adhesive sealant to tail lamp housing bracket (6), lower body panel (8), and body panels (1). (see figures 3-22 and 3-36)

3-13. Tact. Trucks cont.

22. Position tail lamp housing bracket (6) to lower body panel (8) and body panels (1). Secure with thirteen NSN 5320-01-271-6357 rivets (4). (see figure 3-36)
23. Apply P/N (71961) 6099 wicking sealant to fifty-five rivet heads (4) and (7) installed in steps 18 and 22. (see figures 3-23 and 3-36)
24. Spot paint tail lamp housing bracket (6), lower body panel (8), and body panels (1). (see figure 3-36) (Refer to TM 43-0139.)
25. Install tail lamp assembly. (Refer to TM9-2320-280-20.)
26. Install backup light assembly. (Refer to TM9-2320-280-20.)
27. Install battery ground cable. (Refer to TM9-2320-280-20.)
28. Install door weatherstrip. (Refer to TM9-2320-280-20.)

N. RIGHT LOWER/UPPER BODY PANEL REPLACEMENT.

1. Remove door weatherstrip. (Refer to TM9-2320-280-20.)
2. Scribe two lines centered over each of the twenty-one rivet heads (3) and (5) on rear lower/upper body panel (1). Extend scribed lines a minimum of 1.00-inch onto body panels (4). (see figures 3-21 and 3-32)
3. Using a 0.125-inch drill, remove ten rivets (3) that secure rear lower/upper body panel (1) to body panels (4). (see figure 3-32)
4. Using a 0.187-inch drill, remove eleven rivets (5) that secure rear lower/upper body panel (1) to body panels (4).
5. Remove rear lower/upper body panel (1).
6. Remove adhesive residue and clean body panels (4). Do not remove scribed lines marked in step 2.
7. Position 12341083-2 rear lower/upper body panel (1) to body panels (4) and transfer scribed lines marked in step 2. Remove rear lower/upper body panel (1).
8. Using scribed lines marked in step 7, drill ten 0.125-inch diameter holes in rear lower/upper body panel (1).
9. Using scribed lines marked in step 7, drill eleven 0.187-inch diameter holes in rear lower/upper body panel (1).
10. Apply approximately 0.125 inch thickness of NSN 8030-01-347-0964 adhesive sealant to rear lower/upper body panel (1) and body panels (4). (see figures 3-22 and 3-32)
11. Install rear lower/upper body panel (1) to body panels (4) and secure with ten NSN 5320-01-136-3562 rivets (2) and eleven NSN 5320-01-271-6357 rivets (6). (see figure 3-32)
12. Spot paint rear lower/upper body panel (1) and body panels (4). (Refer to TM 43-0139.)

3-13. Tact. Trucks cont.

13. Apply P/N (71961) 6099 wicking sealant to eleven rivet heads (6) installed in step 11. (see figures 3-23 and 3-32)
14. Install door weatherstrip. (Refer to TM9-2320-280-20.)
- O. RIGHT REAR SIDE CORNER BODY PANEL REPLACEMENT.
 1. Remove door weatherstrip. (Refer to TM9-2320-280-20.)
 2. Remove right rear door assembly. (Refer to TM9-2320-280-20.)
 3. Remove rear hinge assemblies. (Refer to TM9-2320-280-20.)
 4. Remove right rear lower/upper body panel. (Refer to paragraph N.)
 5. Scribe two lines centered over each of the seventeen rivet heads (4) on rear side corner body panel (1). Extend scribed lines a minimum of 1.00-inch onto body panels (2). (see figures 3-21 and 3-37)
 6. Using a 0.125-inch drill, remove seven rivets (4) that secure rear side corner body panel (1) to body panels (2). (see figure 3-37)
 7. Using a 0.187-inch drill, remove ten rivets (3) that secure rear side corner body panel (1) to body panels (2).

NOTE

Five rivets that secure rear side corner body panel to vertical support braces are not visible because they are covered by body panels.

8. Separate body panels (2) from rear side corner body panel (1). (see figure 3-37)
9. Transfer five rivet head (3) locations marked "A" onto exterior side of body panels (2); center punch locations marked "A".
10. Drill five 0.125-inch diameter pilot holes through body panel (2) marked in step 9.
11. Using a 0.187-inch diameter drill, remove five rivets (3) marked in steps 9 and 10.
12. Remove rear side corner body panel (1).
13. Remove adhesive residue and clean body panels (2). Do not remove scribed lines marked in steps 5 and 9.
14. Using P/N 12341568-2 rear side corner body panel (2) locate, mark, and drill eight 0.187-inch diameter holes in rear side corner body panel (2). (see figure 3-38)
15. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to two reinforcement assemblies (3) and rear side corner body panel (2). (see figures 3-22 and 3-38)
16. Position two P/N 12341071 reinforcement assemblies (3) in rear side corner body panel (2) and secure with existing two rear hinge assemblies (4), eight washers (6), and screws (5). (see figure 3-38)

3-13. Tact. Trucks cont.

17. Using holes drilled in step 14 on rear side corner body panel (2) as templates, drill eight 0.187-inch diameter holes through two reinforcement assemblies (3). (see figure 3-38)
18. Secure rear side corner body panel (2) and two reinforcement assemblies (3) together with eight NSN 5320-01-271-6357 rivets (1).
19. Remove eight screws (5), washers (6), and two rear hinge assemblies (4) installed in step 16.
20. Position rear side corner body panel (1) to body panels (2) and transfer scribed lines marked in steps 5 and 9. (see figure 3-37) Remove rear side body panel (1).
21. Using scribed lines marked in step 20, drill seven 0.125-inch diameter holes in rear side corner body panel (1).
22. Using scribed lines marked in step 20, drill twenty-two 0.187-inch diameter holes in rear side corner body panel (1).
23. Apply approximately 0.125-inch thickness of NSN 8030-01-347-0964 adhesive sealant to rear side corner body panel (1) and body panels (2). (see figures 3-22 and 3-37)
24. Install rear side corner body panel (1) to body panels (2) and secure with seven NSN 5320-01-136-3562 rivets (7), five NSN 5320-01-264-5978 rivets (5), and seventeen NSN 5320-01-271-6357 rivets (6). (see figure 3-37)
25. Install lower/upper body panel. (Refer to paragraph N.)
26. Spot paint rear side corner body panel (1) and body panels (2). (Refer to TM 43-0139.)
27. Apply P/N (71961) 6099 wicking sealant to thirty rivet heads (1), (5), and (6) installed in steps 18 and 24. (see figures 3-37 and 3-38)
28. Install rear hinge assemblies. (Refer to TM9-2320-280-20.)
29. Install right rear door assembly. (Refer to TM9-2320-280-20.)
30. Install door weatherstrip. (Refer to TM9-2320-280-20.)

PUBLICATIONS AFFECTED:

TM9-2320-280-20

TM9-2320-280-20P

LEVEL OF MAINTENANCE:

Unit

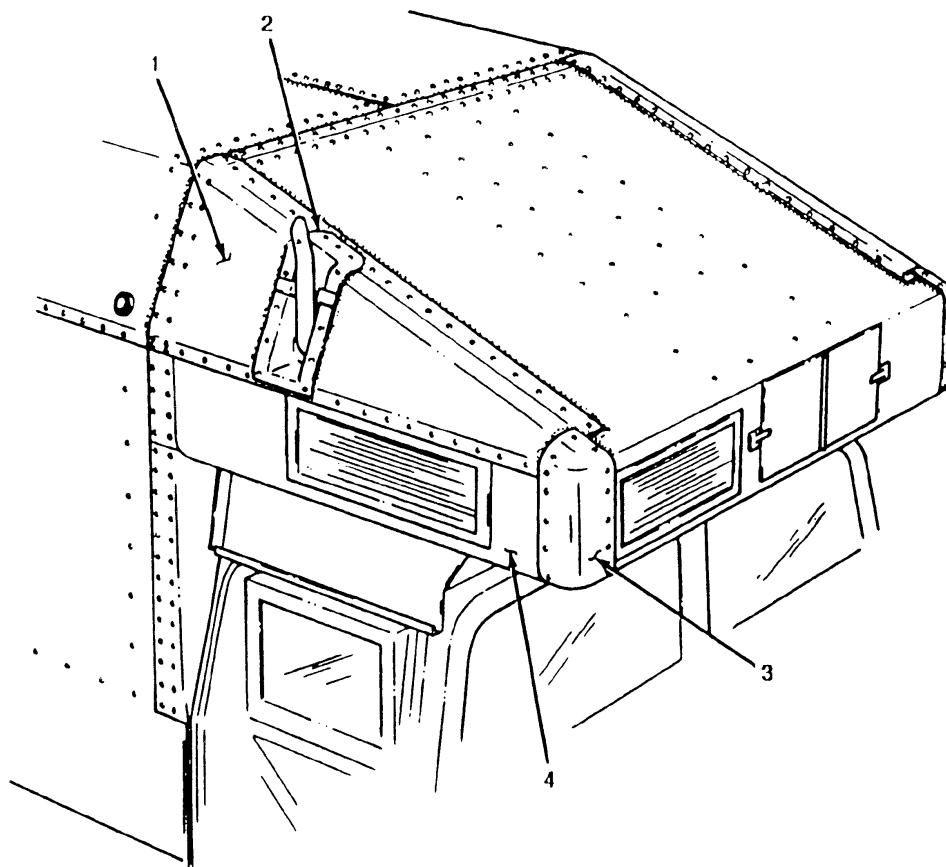


FIGURE 3-18

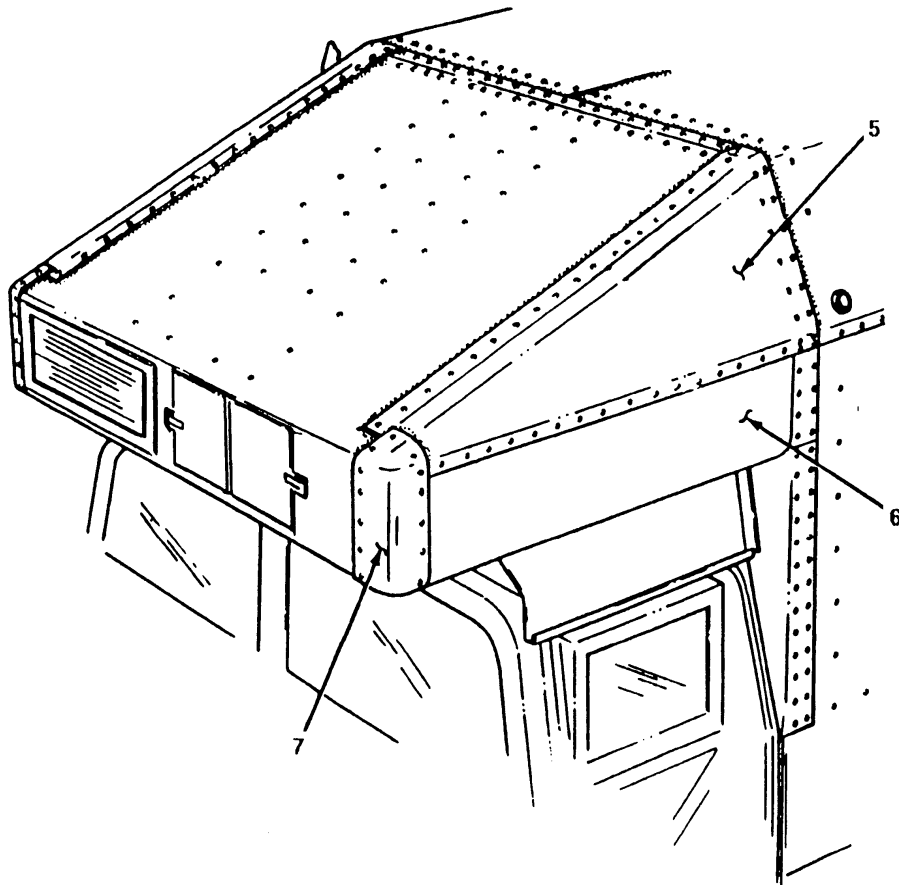


FIGURE 3-19

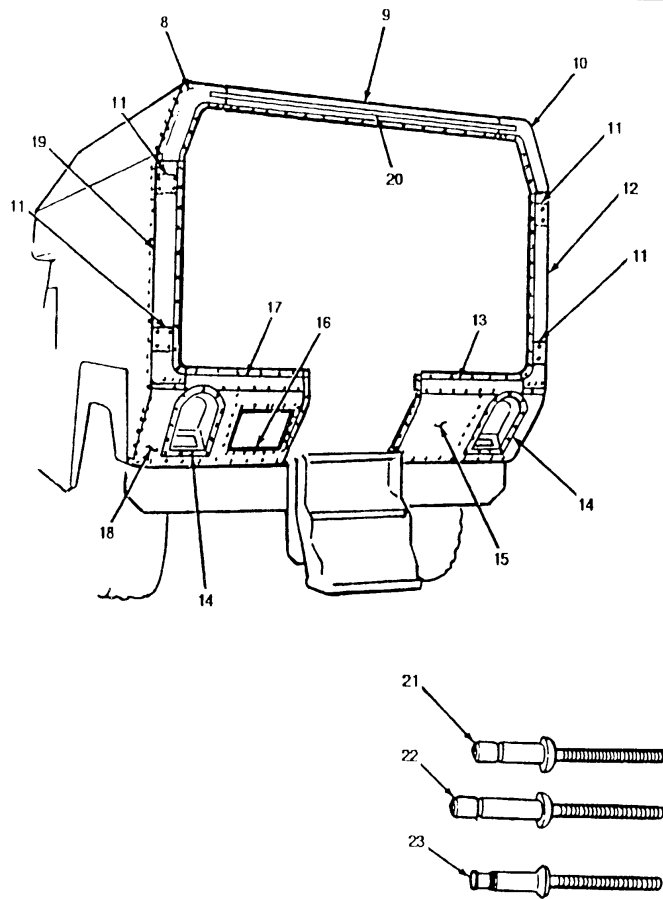
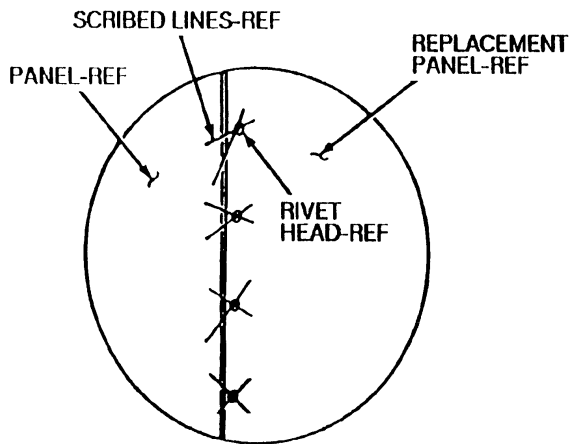
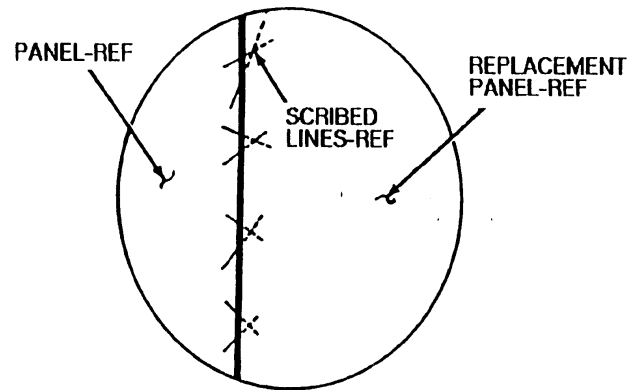


FIGURE 3-20

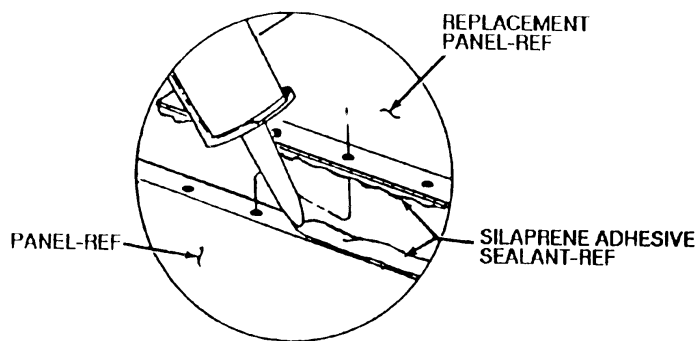


EXAMPLE: TWO SCRIBED LINES CROSSING
AT CENTER OF RIVET HEADS

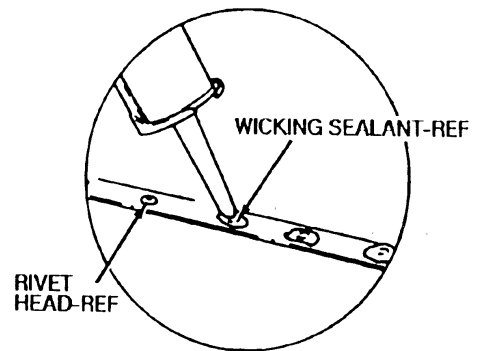


EXAMPLE: TRANSFER OF SCRIBED LINES
TO NEW PART

FIGURE 3-21



EXAMPLE: APPLICATION OF ADHESIVE
TO PANELS



EXAMPLE: APPLICATION OF SEALANT
TO RIVET HEADS

FIGURE 3-22

FIGURE 3-23

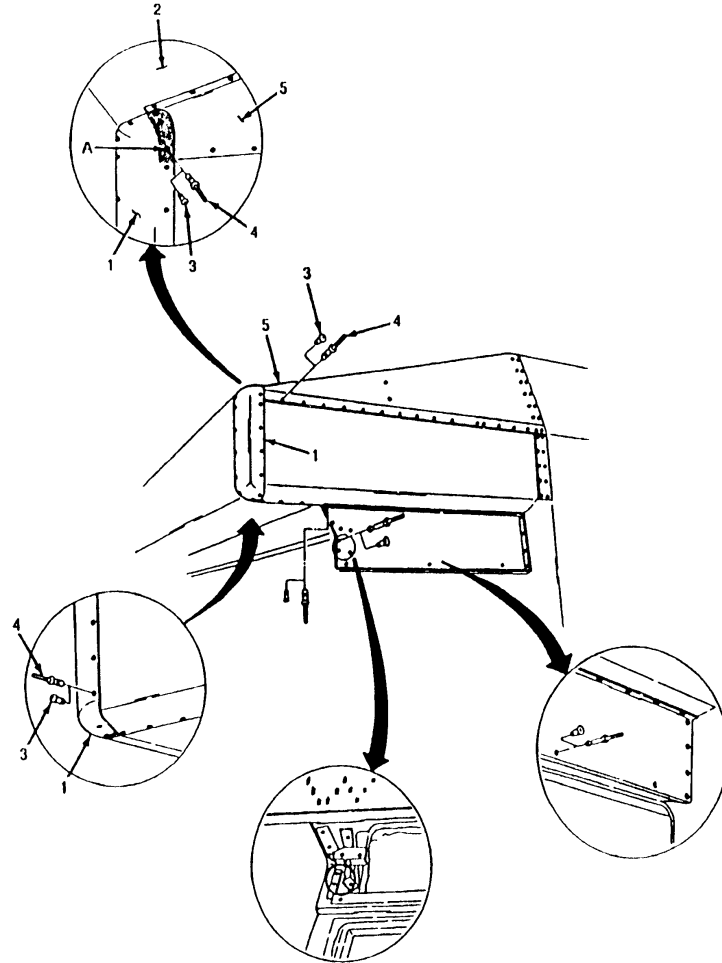


FIGURE 3-24

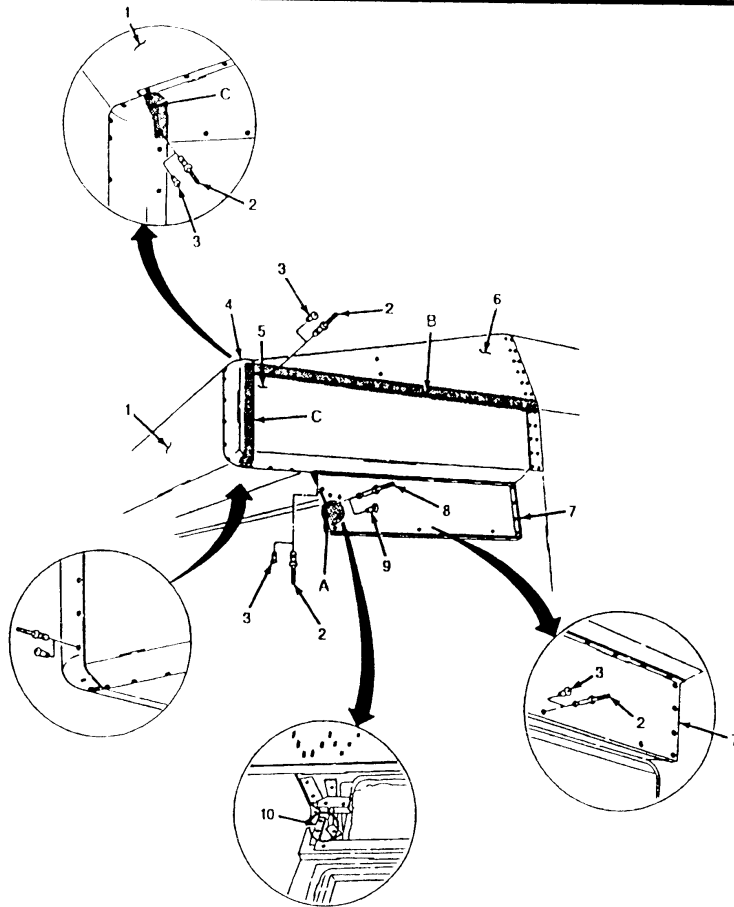


FIGURE 3-25

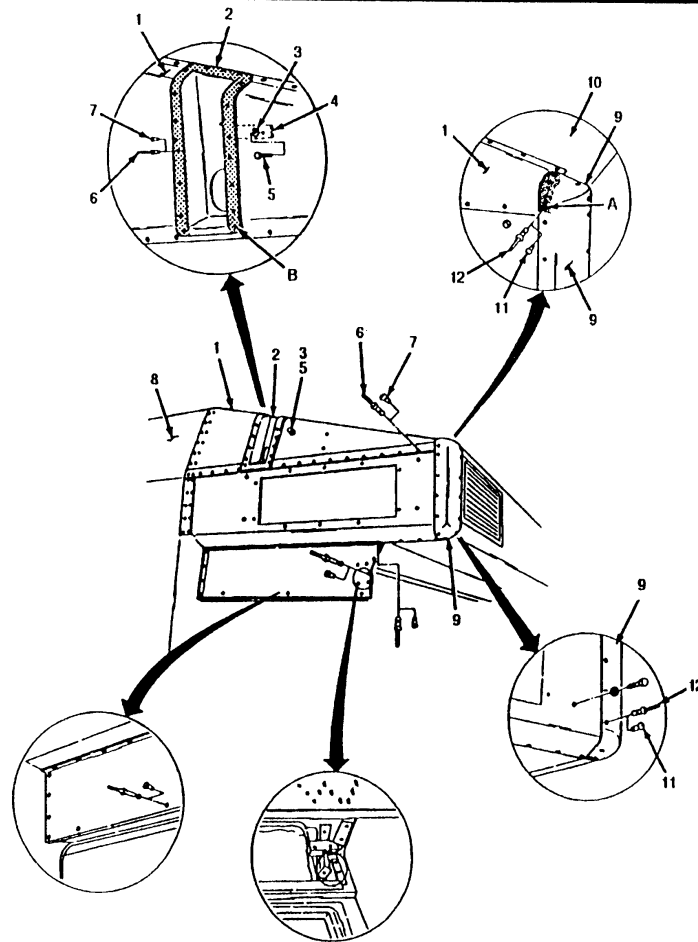


FIGURE 3-26

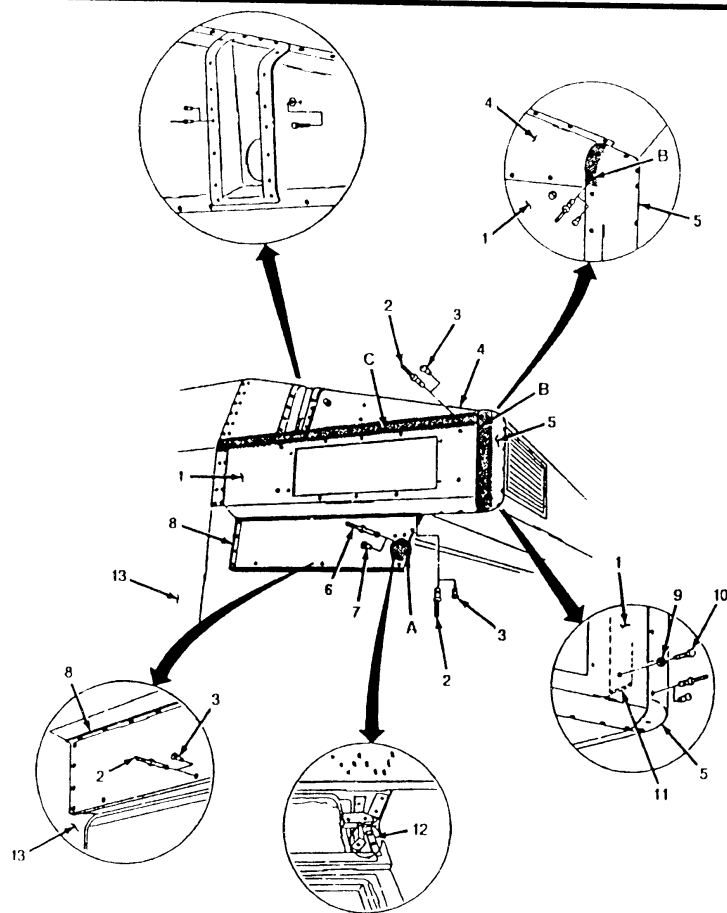


FIGURE 3-27

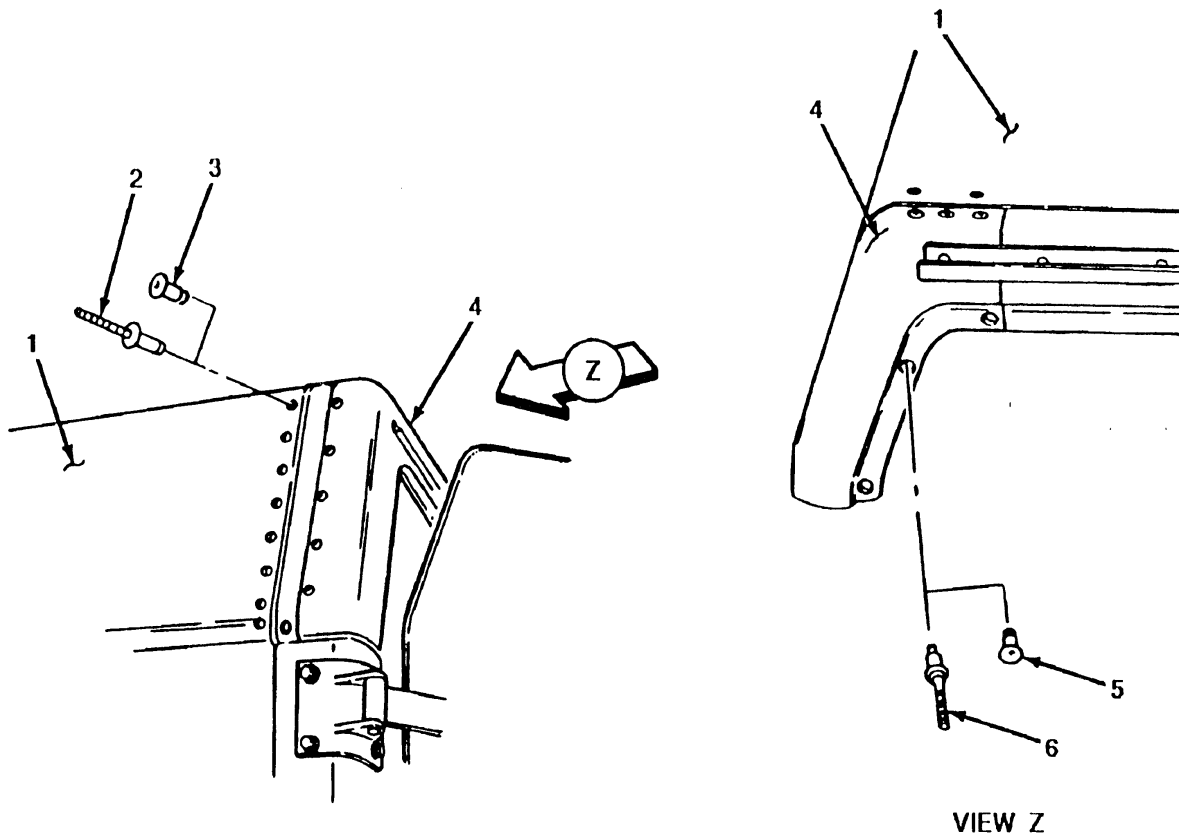


FIGURE 3-28

ALL DIMENSIONS ARE IN INCHES

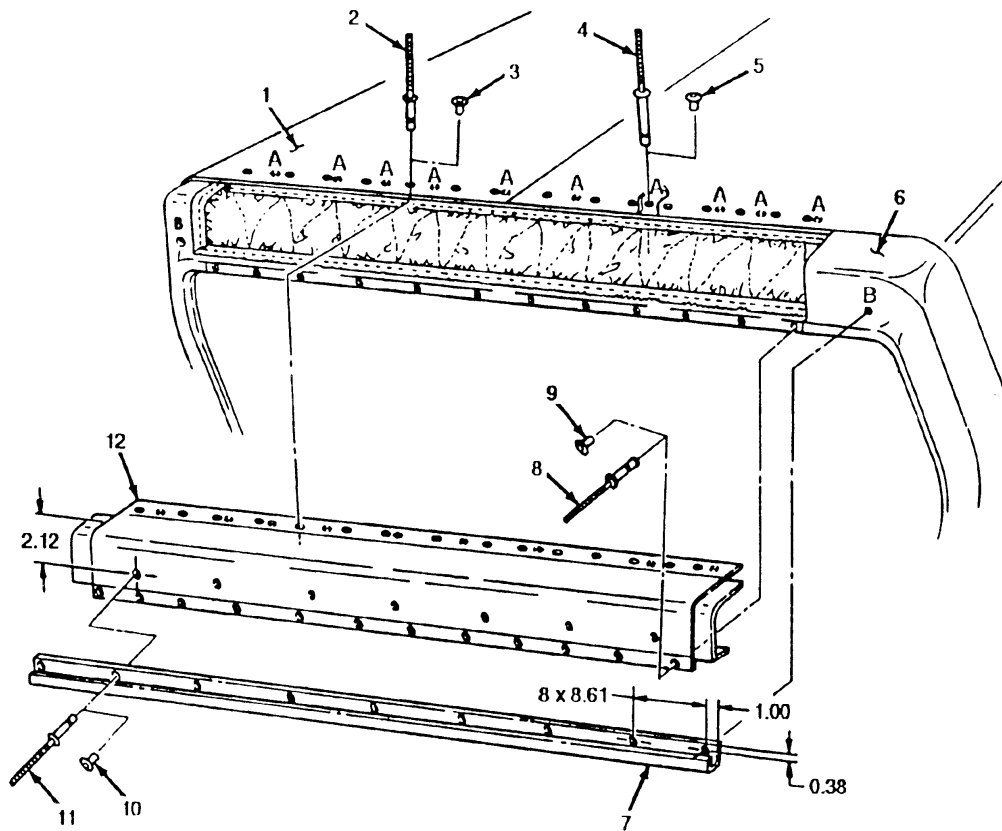


FIGURE 3-29

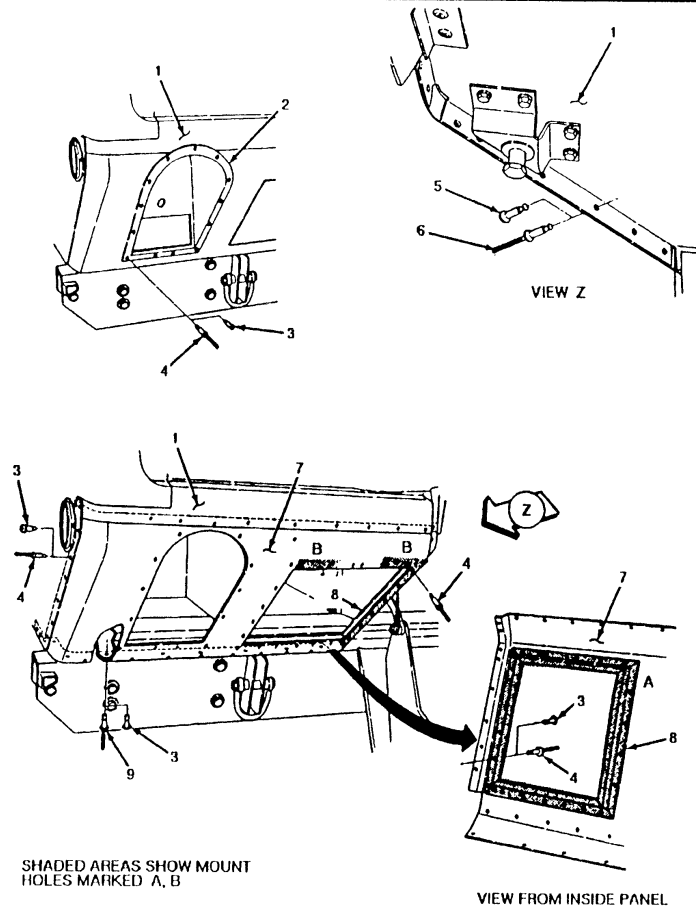


FIGURE 3-30

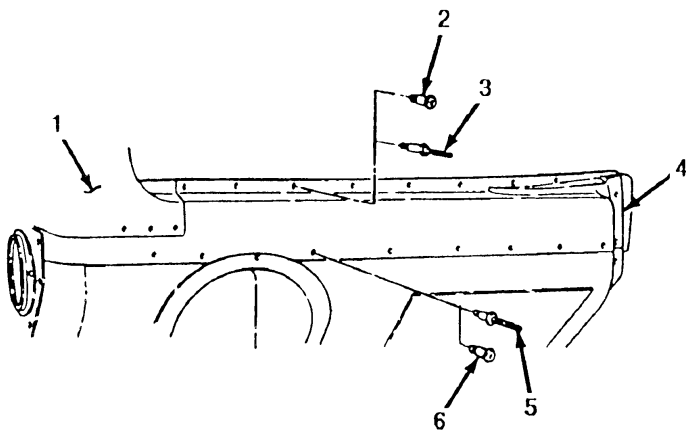


FIGURE 3-31

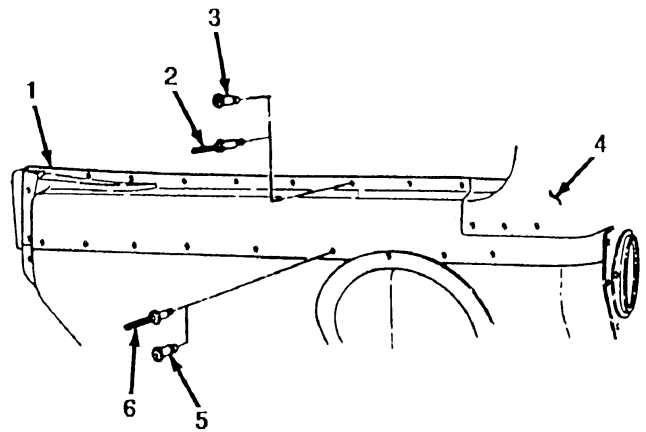


FIGURE 3-32

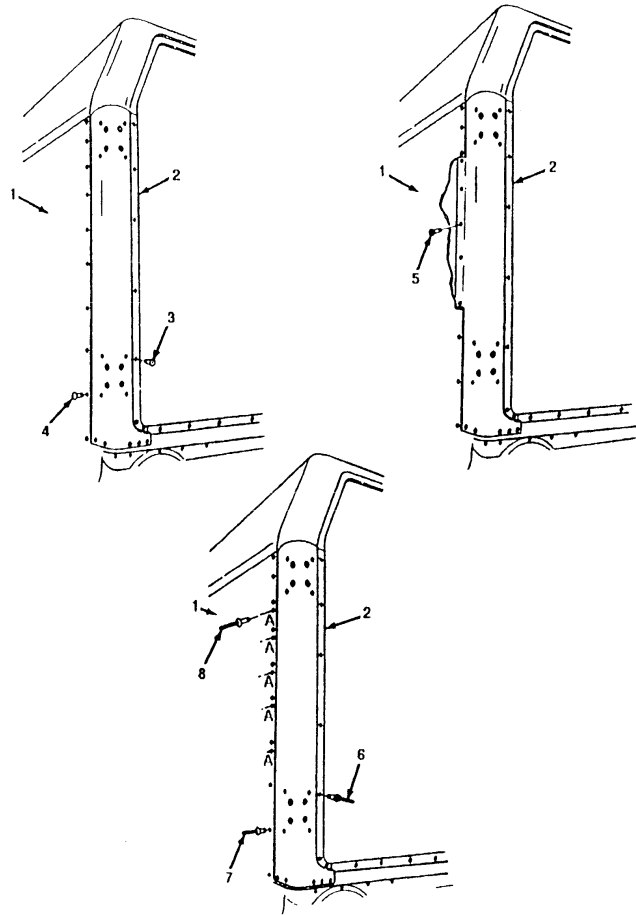


FIGURE 3-33

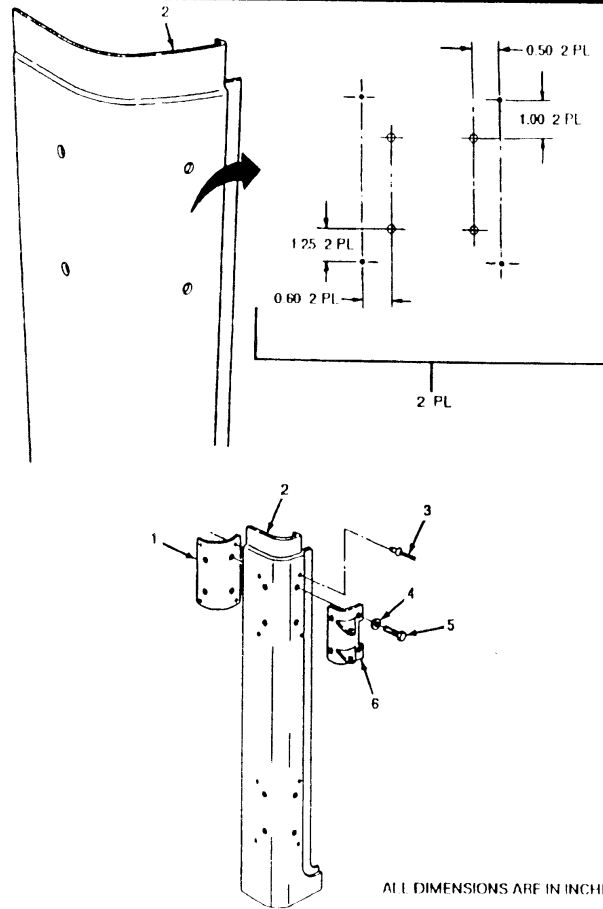


FIGURE 3-34

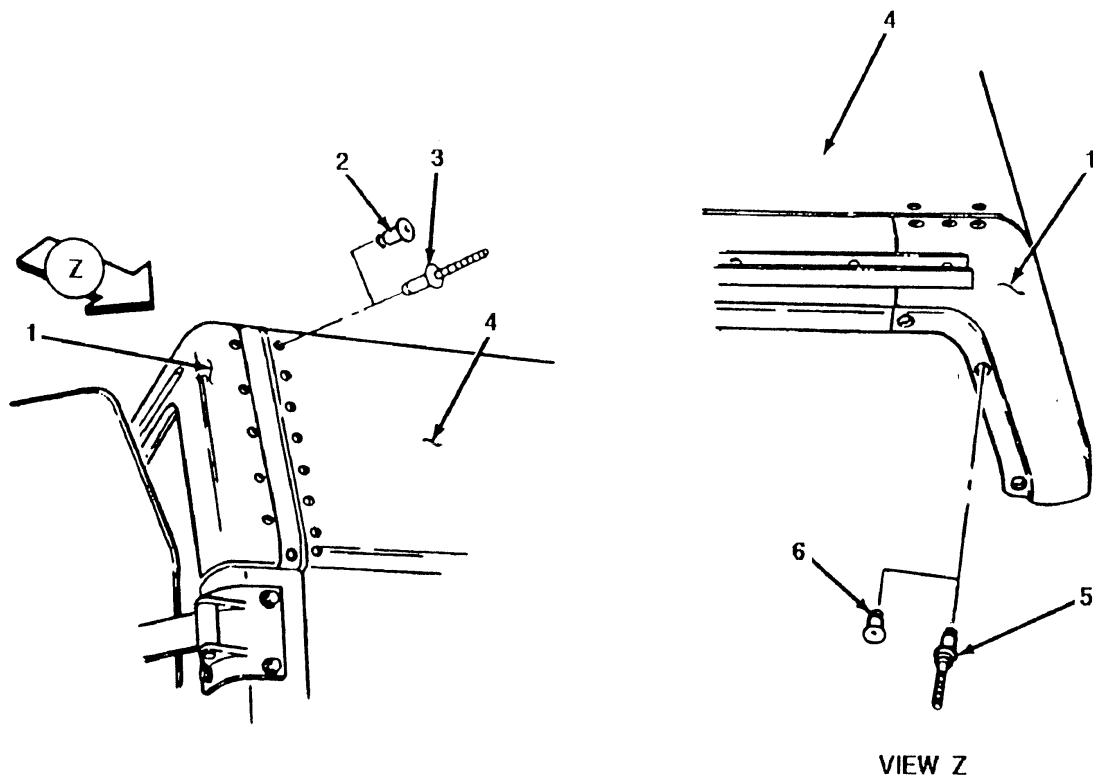


FIGURE 3-35

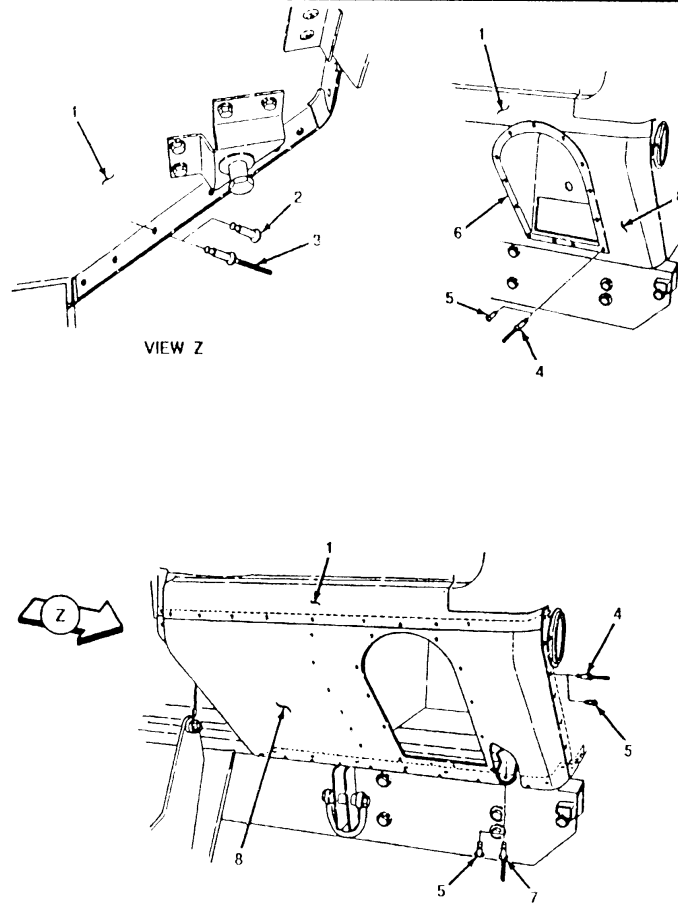


FIGURE 3-36

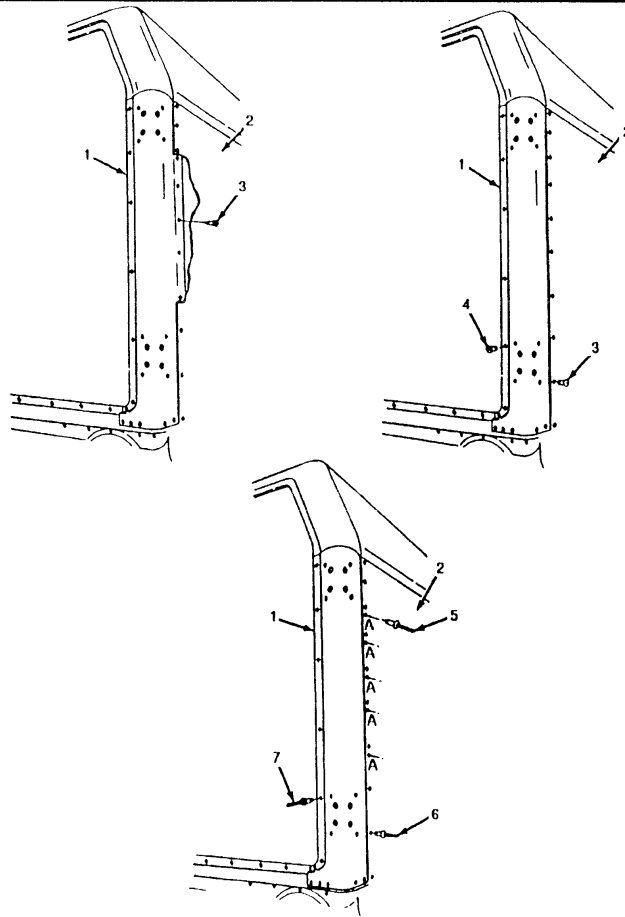


FIGURE 3-37

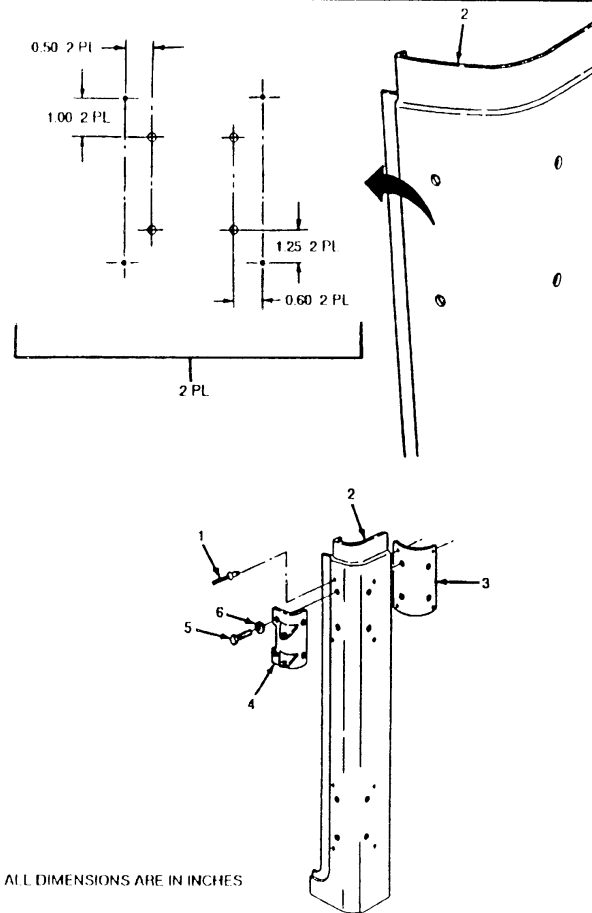


FIGURE 3-38

3-15. Tactical Trucks

MODEL:

M966, M1025, M1026, M1036, M1043, M1044, M1045, and M1046 Vehicles

SUBJECT:

Modification to HMMWVs with turret water leaks

POC:

Mr. Daniel Dudek, AMSTA-MTA, DSN 786-7416, Commercial (313) 574-7416

DEFICIENCY:

Water leaks into the vehicle through the turret support ring.

COMMENTS:

The following procedures for fabrication and installation of a seal, will help deter water from leaking through the turret.

MATERIALS/PARTS:

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QUANTITY</u>
2610-00-051-9602	Inner Tube, Pneumatic	1
8040-00-865-8991	Adhesive	1
5110-00-240-5943	Knife, Pocket	1
5310-00-935-9021	Nuts	15

PROCEDURE:

A. Vehicle Preparation.

1. Remove weapon station hatch. (Refer to TM9-2320-280-20).
2. Remove hinge pivot bracket and gunner's sling. (Refer to TM9-2320-280-20).
3. Remove gunner's sling hook. (Refer to TM9-2320-280-20).
4. Remove weapon station backrest pads. (Refer to TM9-2320-280-20).
5. Remove weapon station hatch latches. (Refer to TM9-2320-280-20).
6. Remove weapon station hatch tube assembly. (Refer to TM9-2320-280-20).
7. Remove TOW mount pedestal, if installed. (Refer to TM9-2320-280-20).
8. Remove TOW mount pedestal cover, if installed. (Refer to TM9-2320-280-20).
9. Remove weapon station inclinometer, if installed. (Refer to TM9-2320-280-20).
10. Remove TOW MGS pan, if installed. (Refer to TM9-2320-280-20).

3-15. Tact. Trucks cont.

11. Remove turret lock. (Refer to TM9-2320-280-20).
12. Remove armament cover and seal, if installed. (Refer to TM9-2320-280-20).
13. Remove armament mount panel, if installed. (Refer to TM9-2320-280-20).
14. Remove traversing bar, if installed. (Refer to TM9-2320-280-20).

NOTE

Note location of attaching hardware for installation.

15. Remove three existing nuts (4), six washers (3), and three screws (2), securing weapon station tray (1) to bearing assembly (5). (see figure 3-19) Discard nuts (4).
16. Remove weapon station tray (1) from bearing assembly (5).
17. Remove twelve nuts (5), twenty-four washers (2), twelve screws (1), and six roof retainers (6) from bearing assembly (3) and support ring (4). (see figure 3-20) Discard nuts (5).

B. Seal Development and Installation.

1. Place NSN 2610-00-051-9602 inner tube (1) on a flat surface. (see figure 3-21)
 2. Using NSN 5110-00-240-5943 knife, cut outer circumference (2) and inner circumference (3) of the inner tube (1).
 3. Center one half of cut inner tube (1) on bearing assembly (2). (see figure 3-22)
 4. Locate and mark twelve places (3) in inner tube (1) where screw holes (4) are located.
 5. Using a 0.375 inch diameter hole punch, punch twelve holes marked in Step 4.
 6. Apply 0.125 inch bead of NSN 8040-00-865-8991 adhesive sealant (5) on bearing assembly (2).
 7. Position cut inner tube (1) on bearing assembly (2).
 8. Position six roof retainers (1) and secure with twelve screws (2), twenty-four washers (3), and twelve NSN 5310-00-935-9021 nuts (4). (see figure 3-23) Tighten nuts to 37 lb-ft (50 N•m).
 9. Using the knife, trim excess material from inner tube (5) 0.125 inch from roof retainers (1).
 10. Position weapon station tray (3) on bearing assembly (4), and secure with three existing screws (1), six washers (2), and three nuts (5). (see figure 3-24) Tighten nuts to 37 lb-ft (50 N•m).
 11. Using the knife, trim excess material from inner tube (6) 0.125 inch along outside edge of weapon station tray (3). Rotate weapon station tray (3).
 12. Install traversing bar, if removed. (Refer to TM9-2320-280-20).
 13. Install armament mount panel, if removed. (Refer to TM9-2320-280-20).
 14. Install armament cover and seal, if removed. (Refer to TM9-2320-280-20).
-
-

3-15. Tact. Trucks cont.

15. Install turret lock. (Refer to TM9-2320-280-20).
16. Install TOW MGS pan, if removed. (Refer to TM9-2320-280-20).
17. Install weapon station inclinometer, if removed. (Refer to TM9-2320-280-20).
18. Install TOW mount pedestal cover, if removed. (Refer to TM9-2320-280-20).
19. Install TOW mount pedestal, if removed. (Refer to TM9-2320-280-20).
20. Install weapon station hatch tube assembly. (Refer to TM9-2320-280-20).
21. Install weapon station hatch latches. (Refer to TM9-2320-280-20).
22. Install weapon station backrest pads. (Refer to TM9-2320-280-20).
23. Install gunner's sling hook. (Refer to TM9-2320-280-20).
24. Install hinge pivot bracket and gunner's sling. (Refer to TM9-2320-280-20).
25. Install weapon station hatch. (Refer to TM9-2320-280-20).

PUBLICATIONS AFFECTED:

TM9-2320-280-20

LEVEL OF MAINTENANCE:

Unit

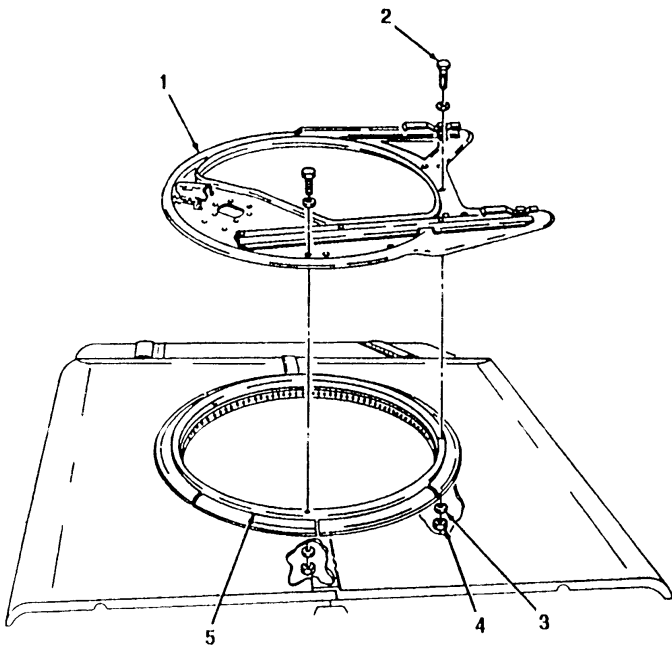


FIGURE 3-19

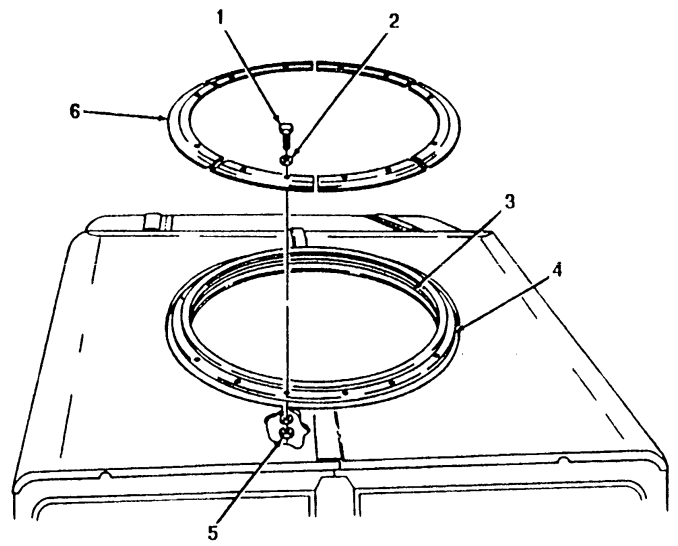


FIGURE 3-20

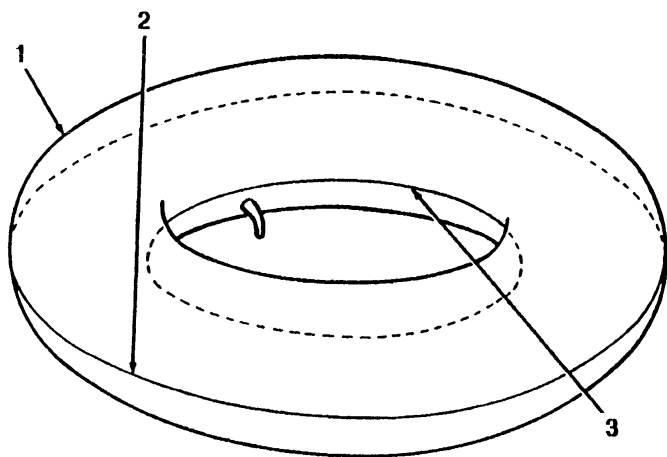


FIGURE 3-21

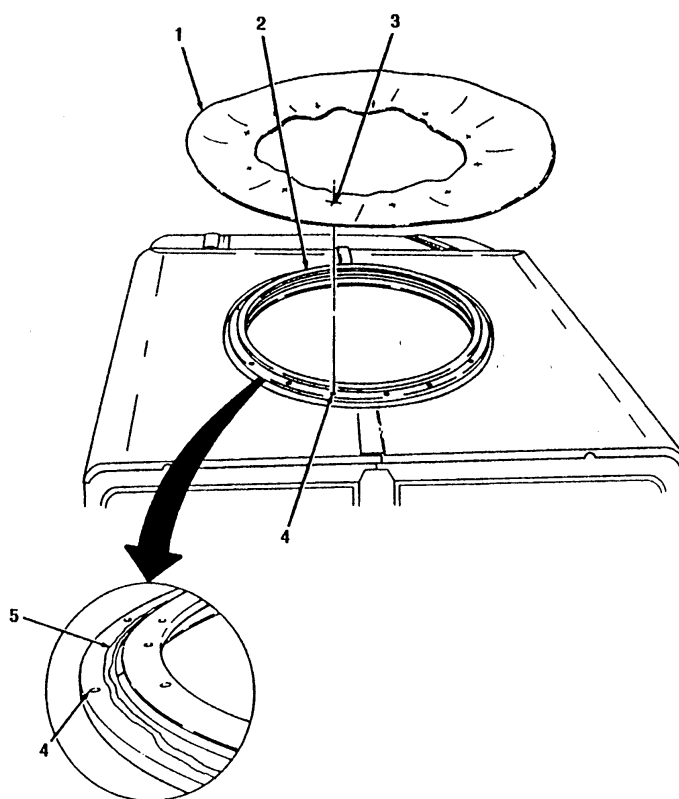


FIGURE 3-22

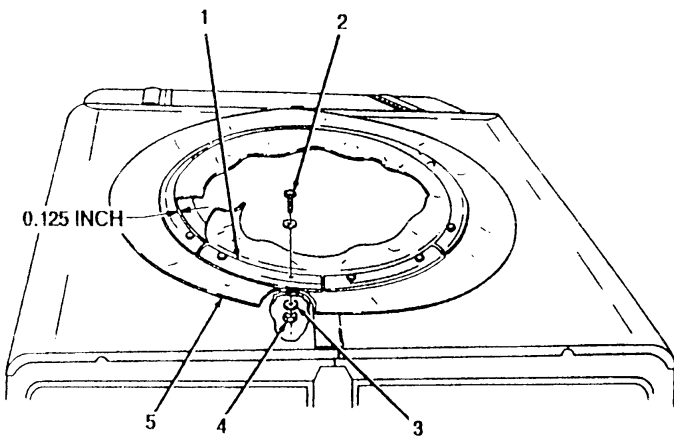


FIGURE 3-23

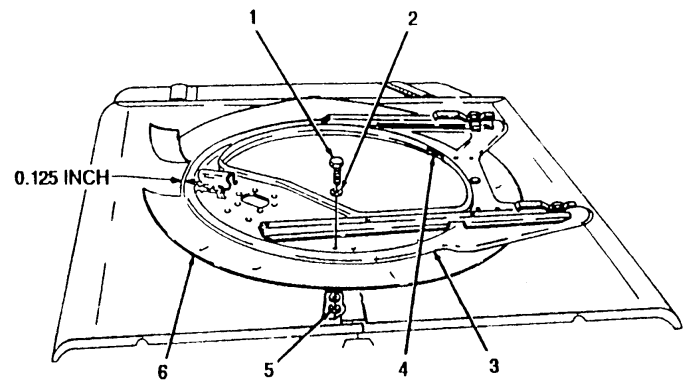


FIGURE 3-24

4-6. Tactical Trucks

MODEL:

M996 and M997

SUBJECT:

NBC Filter Strap on Ambulance

POC:

Mr. David J. Rinke, AMSTA-IM-HLA, DSN 786-8373, Commercial (810) 574-8373
rinked@cc.tacom.army.mil

COMMENTS:

In the past, when your NBC filter strap broke you had to replace the entire bracket. Not anymore - you can use hose clamp, 4720-00-908-6294 as a field fix. If you decide to use this fix, be sure the clamp goes behind the entire bracket and the rivet that holds the old strap is removed before tightening the hose clamp around the filter securing the filter to the bracket.

PUBLICATIONS AFFECTED:

TM9-2320-280-20-3

LEVEL OF MAINTENANCE:

Unit

3-14. Tactical Trucks

MODEL:

HMMWV, M966, M966A1, M1025, M1025A1, M1026, M1026A1, M1036, M1043, M1043A1, M1044, M1044A1, M1045, M1045A1, M1046, and M1046A1 Vehicles

SUBJECT:

Rear Cargo Door Gas Spring Assemblies

POC:

Ms. Jody McInerney, AMSTA-MTA, DSN 786-7346, Commercial (810) 574-7346
mcinerj@cc.tacom.army.mil

DEFICIENCY:

Reports from the field indicate that the gas spring assemblies on armament carriers have failed to keep rear cargo doors open. The gas spring assemblies are made of a short and long gas spring positioned in opposite directions in a telescopic steel cover. The long spring oriented in the upward direction is subject to insufficient seal lubrication leading to premature failure.

COMMENTS:

If the gas spring assemblies will not keep the rear cargo door open, the defective gas spring should be replaced. Improved internal lubrication of the gas spring can extend its service life. This can be accomplished by rotating the gas spring assemblies 180 degrees every six months moving left spring to right side, and right spring to left side. This procedure will be added as a maintenance task and to the Preventive Maintenance Checks and Services (PMCS) during the next manual update. The task can be accomplished in the field using the following procedure.

PROCEDURE:**NOTE**

Prior to starting any maintenance, ensure forward end of cargo shell door is locked.

1. Remove cargo door strap. (Refer to TM9-2320-280-20)
2. Remove cargo door retention cables. (Refer to TM9-2320-280-20)

NOTE

A 2 x 4 x 79.25 inch long board can be used to support cargo door in the open position.

3-14. Tact. Trucks cont.

3. Secure rear cargo door (4) in full open position. (see figure 3-60)
4. Remove four retaining rings (1) from rod sockets (2) on two gas spring assemblies (5).

WARNING

Do not attempt to remove gas spring assemblies from ball studs until cargo door is supported in the full open position. Failure to do so may result in injury to personnel or damage to equipment.

5. Remove left and right gas spring assemblies (5) from ball studs (3) on cargo door (4) and body bracket (6). (see figure 3-60)

NOTE

When installing gas spring assemblies (1) ensure the small end is installed on the cargo door (3) and the large end is installed on body brackets (4). (see figure 3-61)

6. Invert left gas spring assembly (1) 180 degrees and position to right side of vehicle. (see figure 3-61)
7. Invert right gas spring assembly (1) 180 degrees and position to left side of vehicle.
8. Install left and right gas spring assemblies (5) over ball studs (3) on cargo door (4) and body brackets (6). (see figure 3-62)
9. Install four retaining rings (1) in rod sockets (2) on two gas springs (5).
10. Remove cargo door support.
11. Install two retention cables (Refer to TM9-2320-280-20)
12. Install cargo door strap. (Refer to TM9-2320-280-20)
13. Check operation of cargo door.

PUBLICATIONS AFFECTED:

TM9-2320-280-20

LEVEL OF MAINTENANCE:

Unit

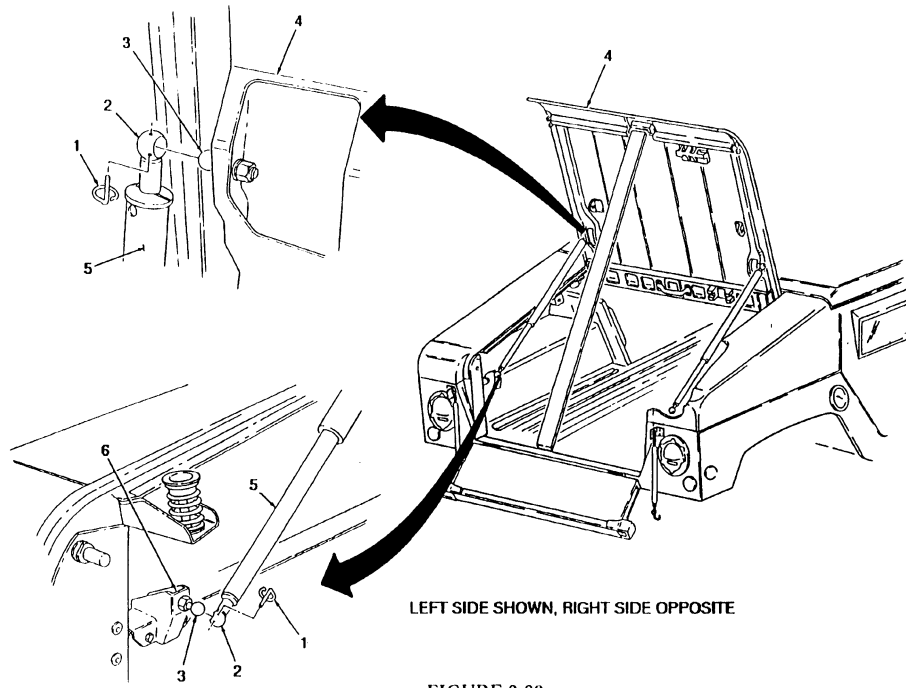
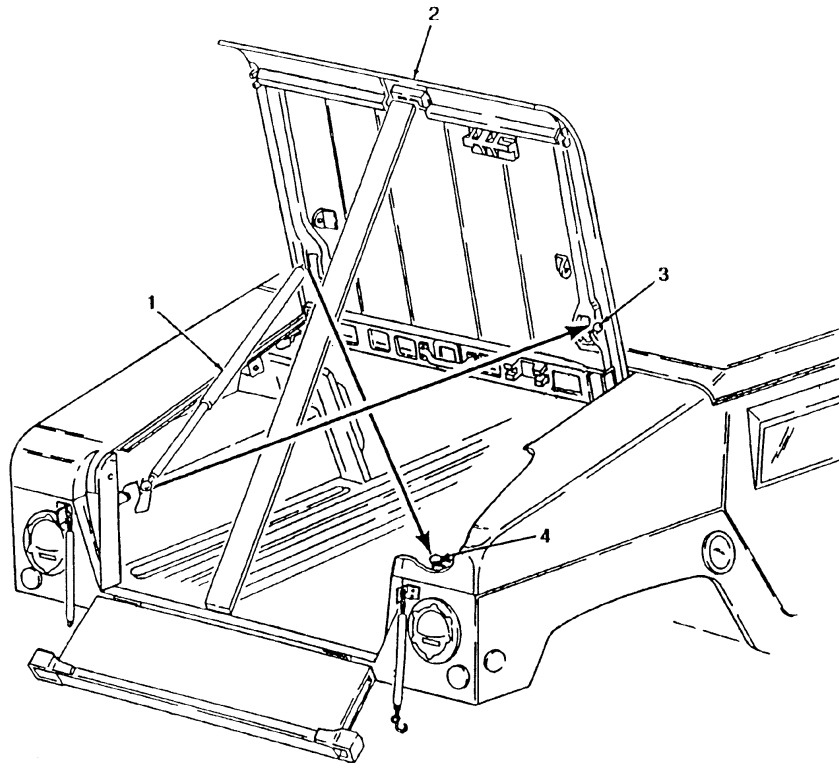


FIGURE 3-60



LEFT SIDE SHOWN, RIGHT SIDE OPPOSITE

FIGURE 3-61

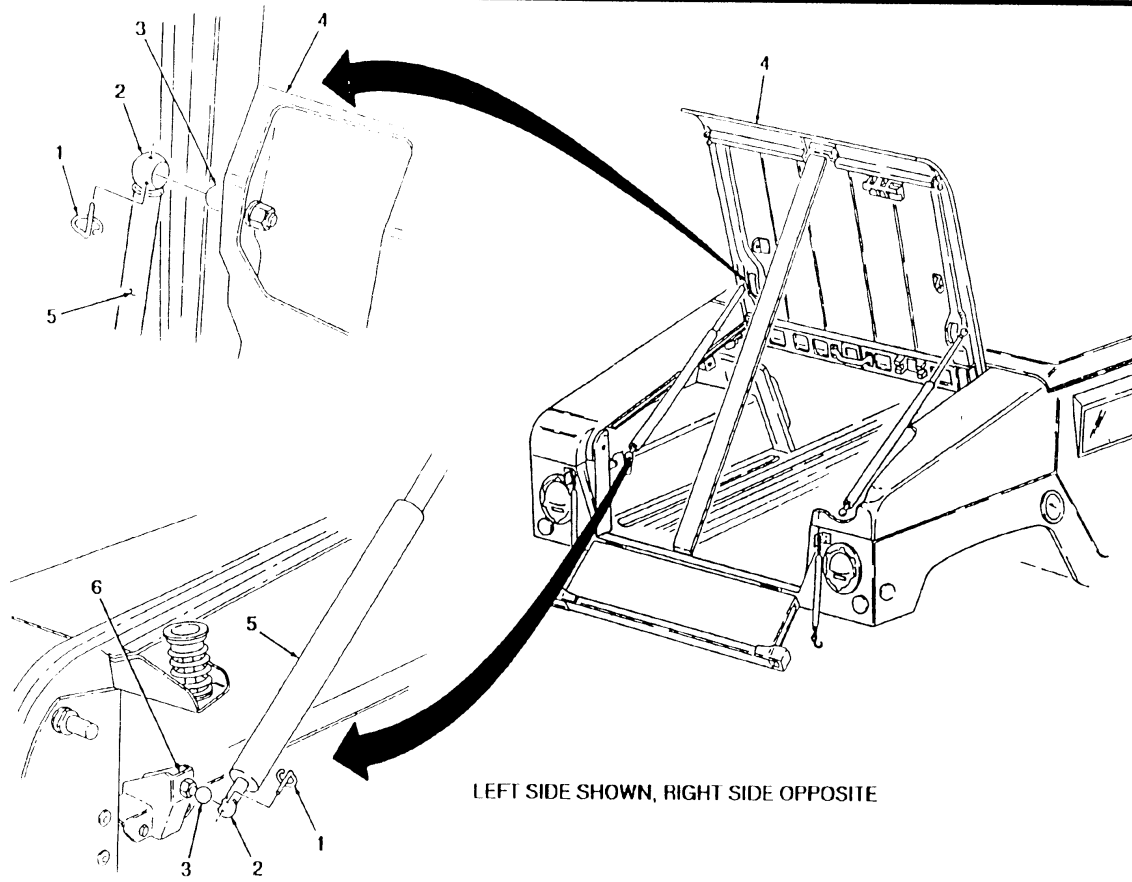


FIGURE 3-62

8-146

3-10. Tactical Trucks**MODEL:**

M966, M966A1, M1025, M1025A1, M1026, M1026A1, M1036, M1043, M1043A1, M1044, M1044A1, M1045, M1045A1, M1046, and M1046A1 Vehicles

SUBJECT:

Turret Cleaning

POC:

Mr. Daniel Dudek, AMSTA-IM-HLA, DSN 786-7493, Commercial (810) 574-7493
dudekd@cc.tacom.army.mil

DEFICIENCY:

The current design of the weapon station requires removal of the weapon station tray to gain access for cleaning dirt out from the bearings and race.

COMMENTS:

Procedures have been developed to fabricate a fixture used to position a precise depth hole in the turret bearing and attach a fabricated hose assembly to the turret bearing. The fabricated hose assembly will allow low-pressure water to clean dirt from around the turret bearings and race. Fabrication and installation of the fixture and hose assembly can be accomplished in the field using the following materials and parts.

MATERIALS/PARTS:

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
4730-00-024-3971	Clamp, Hose	2
4730-00-140-3770	Adapter, Straight	1
4730-00-193-2709	Nipple, Pipe	1
4730-00-322-8237	Coupling, Pipe	1
4730-00-547-0941	Adapter, Straight Swivel	1
4730-01-309-0949	Adapter, Straight	1
8030-01-054-0740	Sealing Compound	AR
9510-00-229-4822	Bar, Metal	AR
9530-00-226-0380	Bar, Metal	AR
	Hose, 3/8-in. ID x 5/8-in. OD	3 ft

3-10. Tact. Trucks cont.

PROCEDURES:

A. Fabrication of Fixture.

1. Using NSN 9530-00-226-0380 metal bar or suitable substitute, fabricate fixture. (see figure 3-8)
2. Using NSN 9510-00-229-4822 metal bar or suitable substitute, fabricate bushing. (see figure 3-9)
3. Press bushing (2) into fixture hole (1). (see figure 3-10)

B. Fabrication of Hose.

1. Position NSN 4730-00-024-3971 hose clamp (3) and NSN 4730-01-309-0949 straight adapter (2) on three feet of hose (4) and tighten hose clamp (3). (see figure 3-11)

NOTE

Do not apply sealing compound to first two threads of straight adapter.

2. Apply NSN 8030-01-054-0740 sealing compound to threads of straight adapter (2) and connect NSN 4730-00-547-0941 straight swivel adapter (1) to straight adapter (2). (see figure 3-11)
3. Position NSN 4730-00-024-3971 hose clamp (5) and NSN 4730-00-140-3770 straight adapter (6) on hose (4) and tighten hose clamp (5).

NOTE

Do not apply sealing compound to first two threads of straight adapter.

4. Apply sealing compound to threads of straight adapter (6) and connect NSN 4730-00-322-8237 pipe coupling (7) to straight adapter (6). (see figure 3-11)

NOTE

Do not apply sealing compound to first two threads of pipe nipple.

5. Apply sealing compound to threads of NSN 4730-00-193-2709 pipe nipple (8) and connect pipe nipple (8) to pipe coupling (7). (see figure 3-11)

3-10. Tact. Trucks cont.

C. Vehicle Preparation.

1. Locate and mark position on inner bearing (1) between widest crossmembers of hatch tube (2). (see figure 3-12)
2. Remove weapon station tray and seal. (Refer to TM9-2320-280-20.)
3. Secure fixture (1) to inner bearing (2) with centerline of hole in fixture (1) aligned with mark on inner bearing (2). (see figure 3-13)
4. Position 0.339-inch drill bit (2) (letter R drill bit) four inches from drill chuck jaws (1). (see figure 3-14)
5. Drill 0.339-inch diameter hole (3) on inner bearing (1) using fixture (2). (see figure 3-15)
6. Remove fixture (2) from inner bearing (1).

CAUTION

Ensure to spread ball bearings apart where drill bit will come through inner bearing or drill bit may damage ball bearings.

NOTE

Ensure 0.234-inch drill bit is positioned at center of 0.339-inch diameter hole. Do not drill 0.234-inch diameter hole through outer bearing.

7. Using hole location drilled in step 5, drill 0.234-inch diameter hole (2) through inner bearing (1). (see figure 3-16)

NOTE

Ensure to clean metal shavings from hole in inner bearing after threading hole.

8. Using 0.125-27 NPT standard tap, thread hole (3) drilled in step 5. (see figure 3-16)
9. Remove tapered end (1) on 0.125-27 NPT standard tap (2). (see figure 3-17)
10. Using modified 0.125-27 NPT tap, finish threading hole (3) started in step 8. (see figure 3-16)

D. Assembly and Cleaning Procedure.

1. Insert hose assembly (3) in hole (2) on inner bearing (1). (see figure 3-18)
 2. Install weapon station tray and seal. (Refer to TM9-2320-280-20.)
-
-

3-10. Tact. Trucks cont.

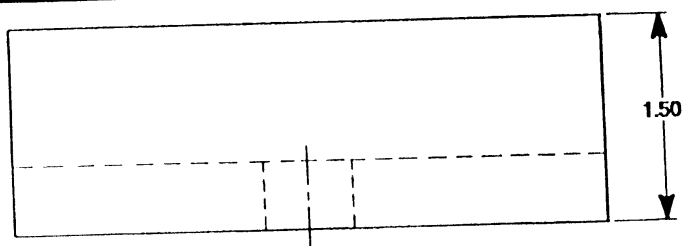
3. Connect low-pressure water hose (2) to hose assembly (1). (see figure 3-19)
4. Turn on water and rotate weapon station tray several full rotations to allow water to force out any dirt or grit within turret bearing. After cleaning is completed, turn off water.
5. Disconnect low-pressure water hose (2) from hose assembly (1).
6. Hose assembly (1) may either be stowed in place on weapon station tray or removed.

PUBLICATIONS AFFECTED:

TM9-2320-280-10
TM9-2320-280-24P

LEVEL OF MAINTENANCE:

Direct Support



NOTES:

- (1) ALL DIMENSIONS ARE IN INCHES.
- (2) MATERIAL:
 - A. ALUMINUM ALLOY,
D1 FLAT
2.000 THICK
3.000 WIDE
4.20 LENGTH
 - B. OR SUITABLE SUBSTITUTE
- (3) REMOVE ALL BURRS AND SHARP EDGES.

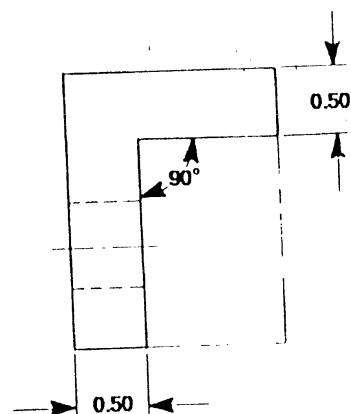
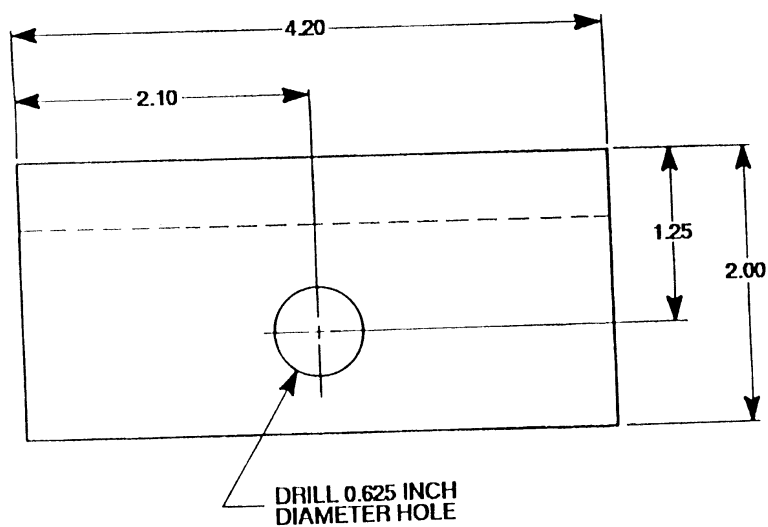


FIGURE 3-8

NOTES:

- (1) ALL DIMENSIONS ARE IN INCHES.
- (2) MATERIAL:
 - A. STEEL
 - D7 ROUND
 - ASTM A108, GRADE 1045
 - 0.625 INCH DIAMETER ROD
 - B. OR SUITABLE SUBSTITUTE
- (3) REMOVE ALL BURRS AND SHARP EDGES.

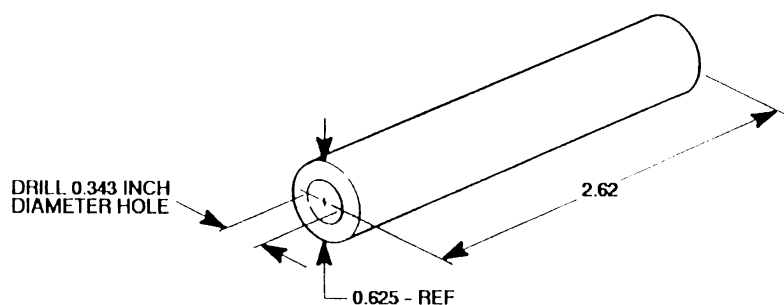


FIGURE 3-9

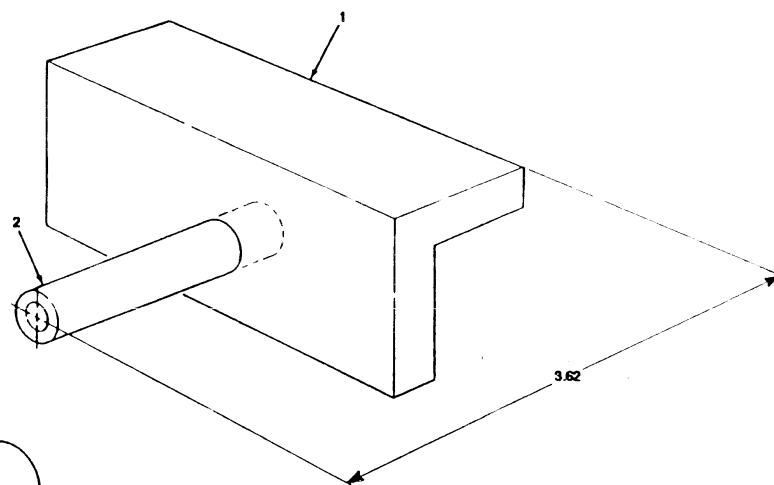


FIGURE 3-10

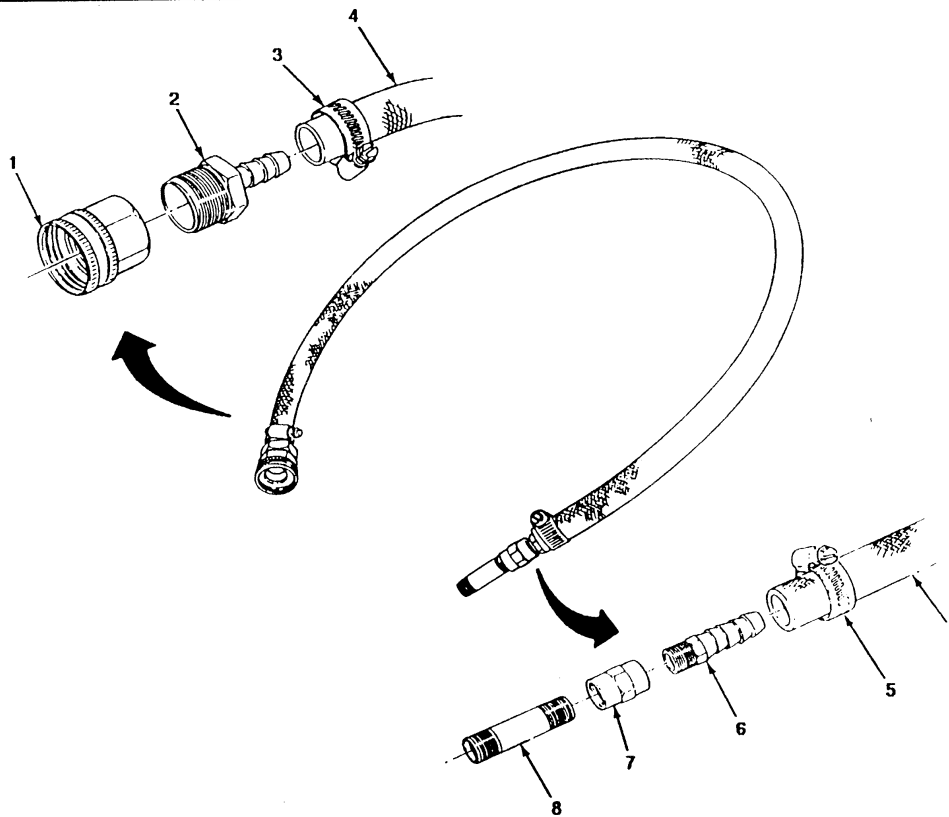


FIGURE 3-11

NOTE: ALL DIMENSIONS ARE IN INCHES.

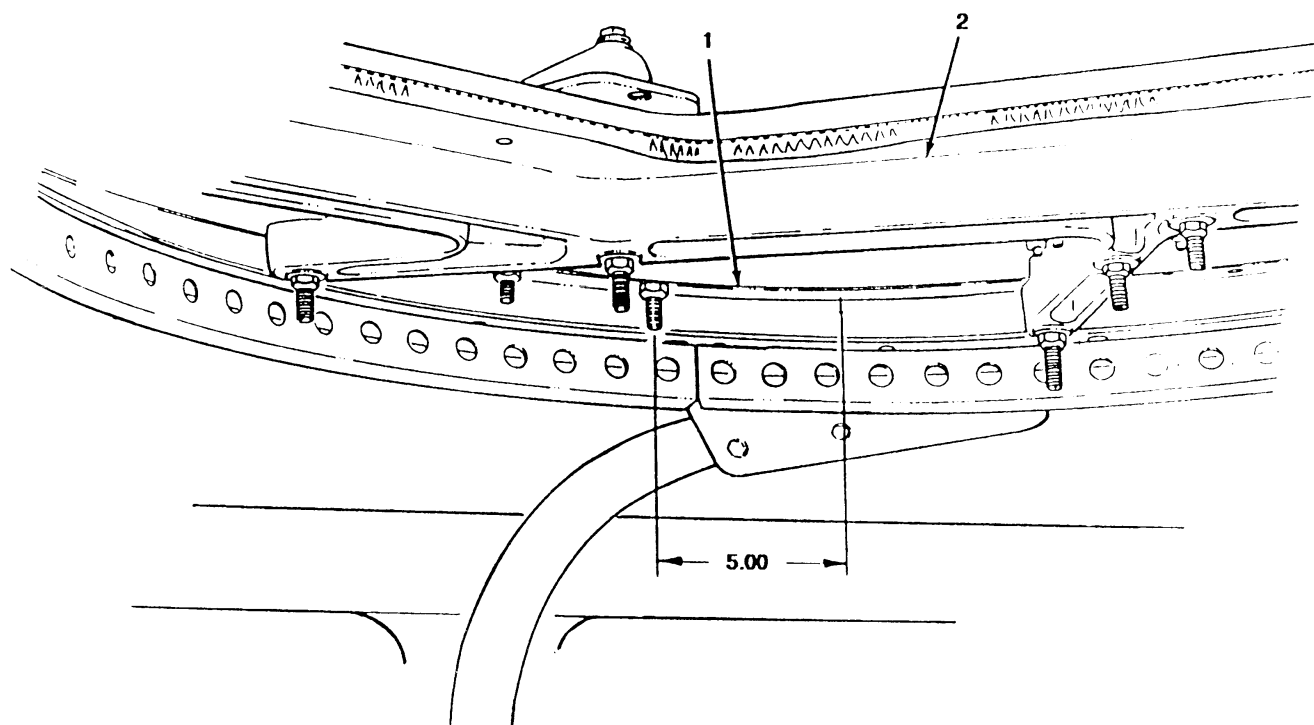


FIGURE 3-12

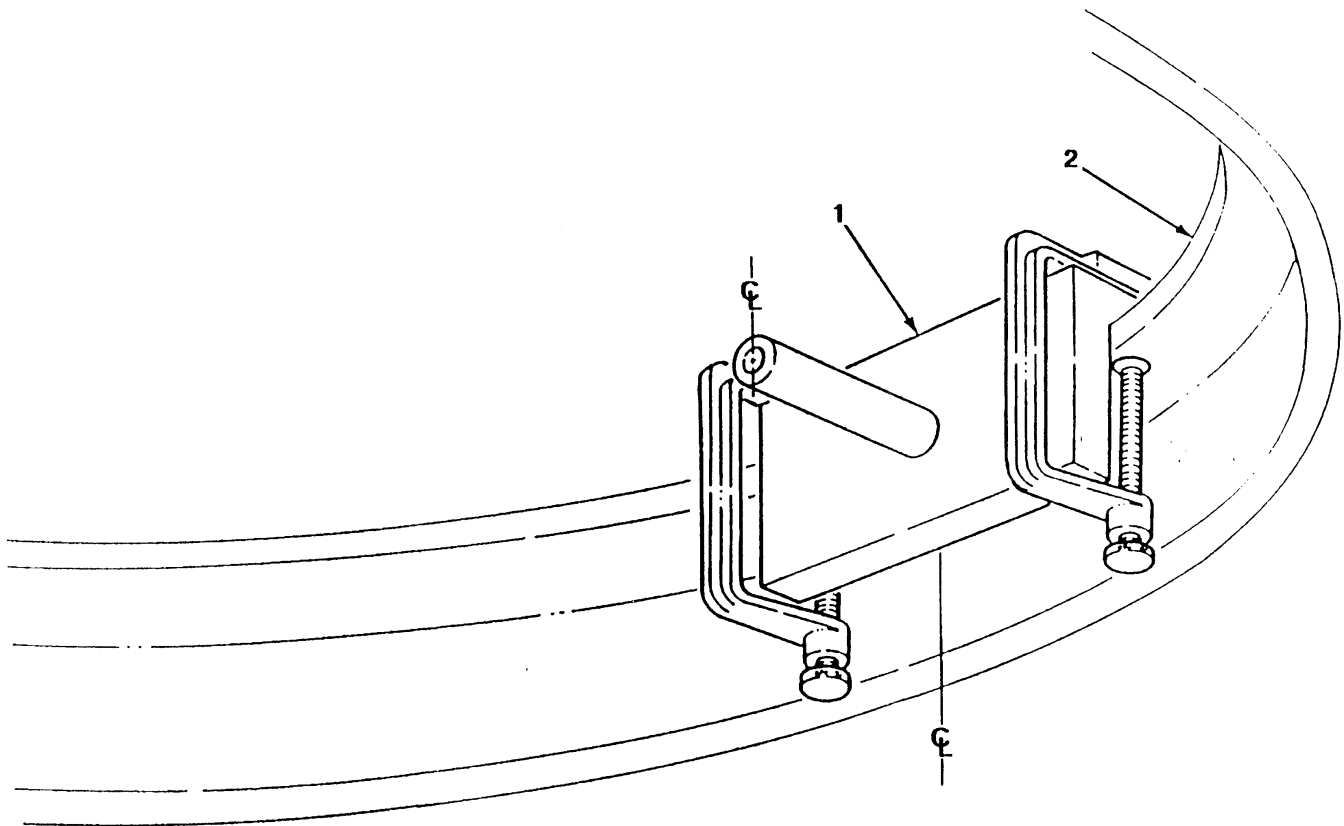


FIGURE 3-13

NOTE: ALL DIMENSIONS ARE IN INCHES.

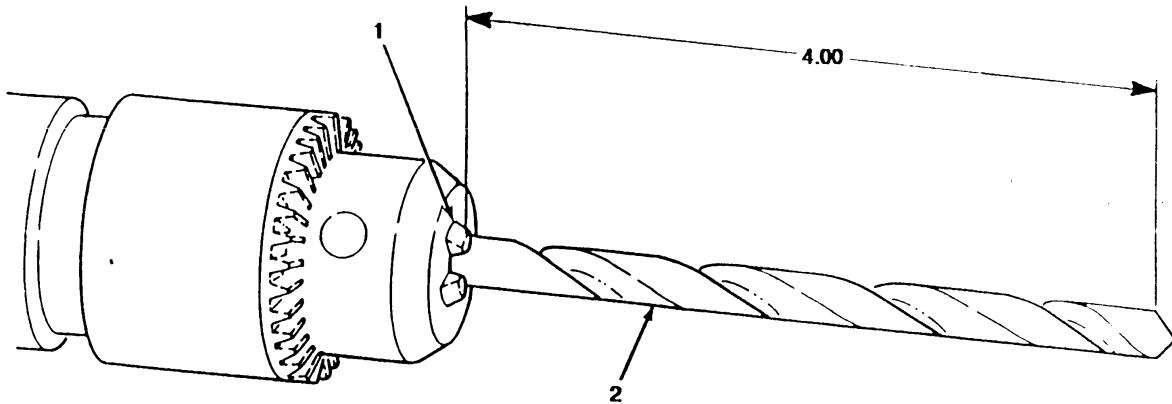


FIGURE 3-14

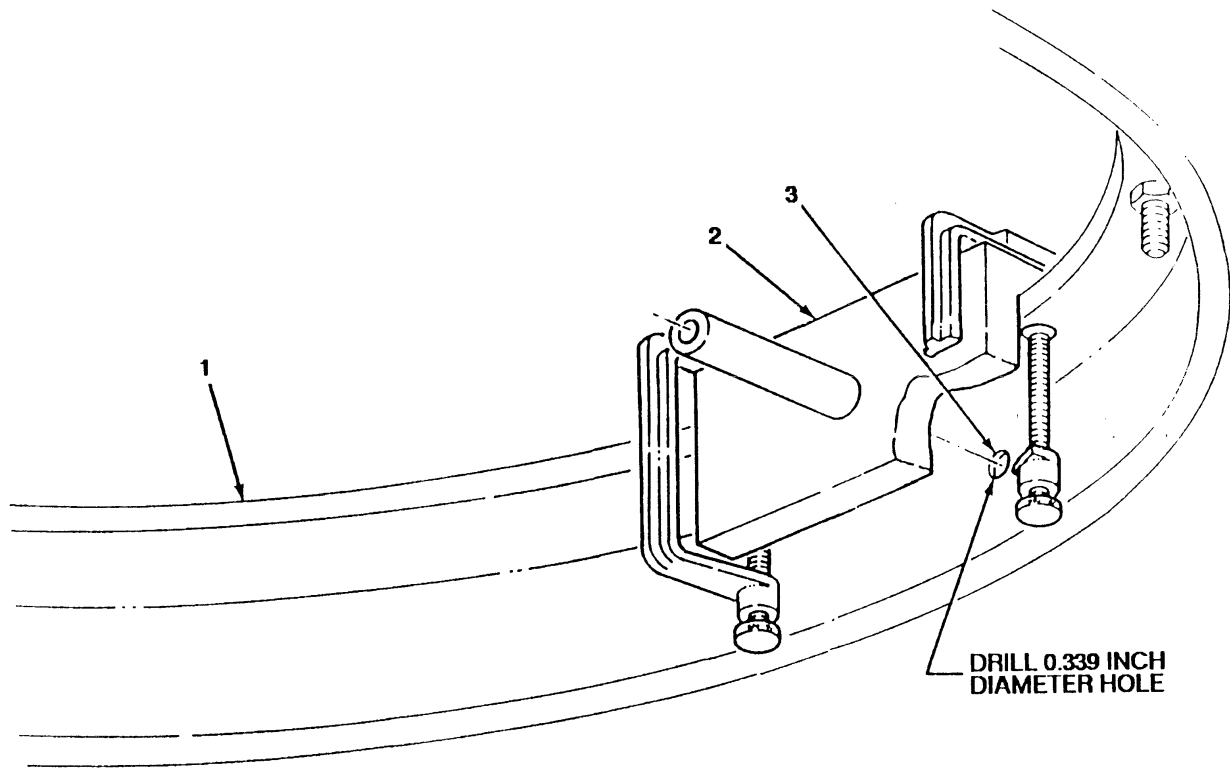


FIGURE 3-15

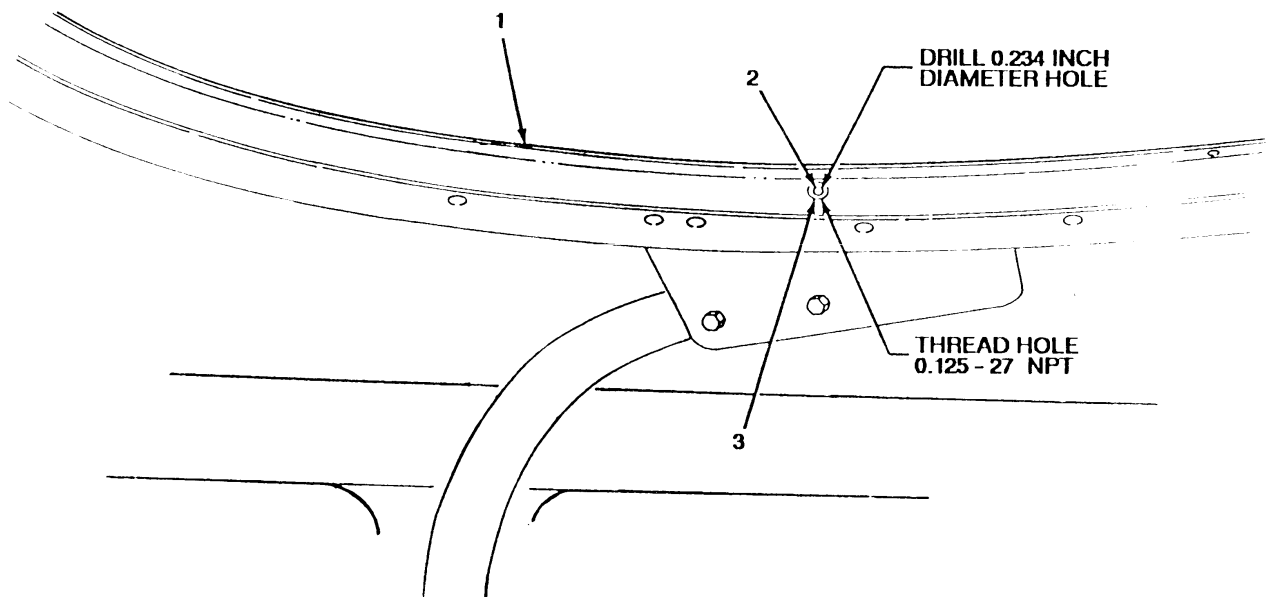


FIGURE 3-16

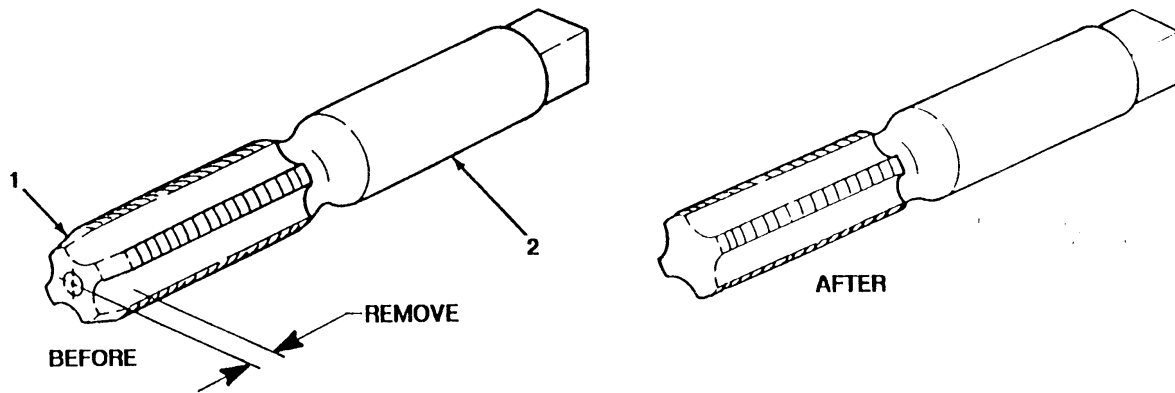


FIGURE 3-17

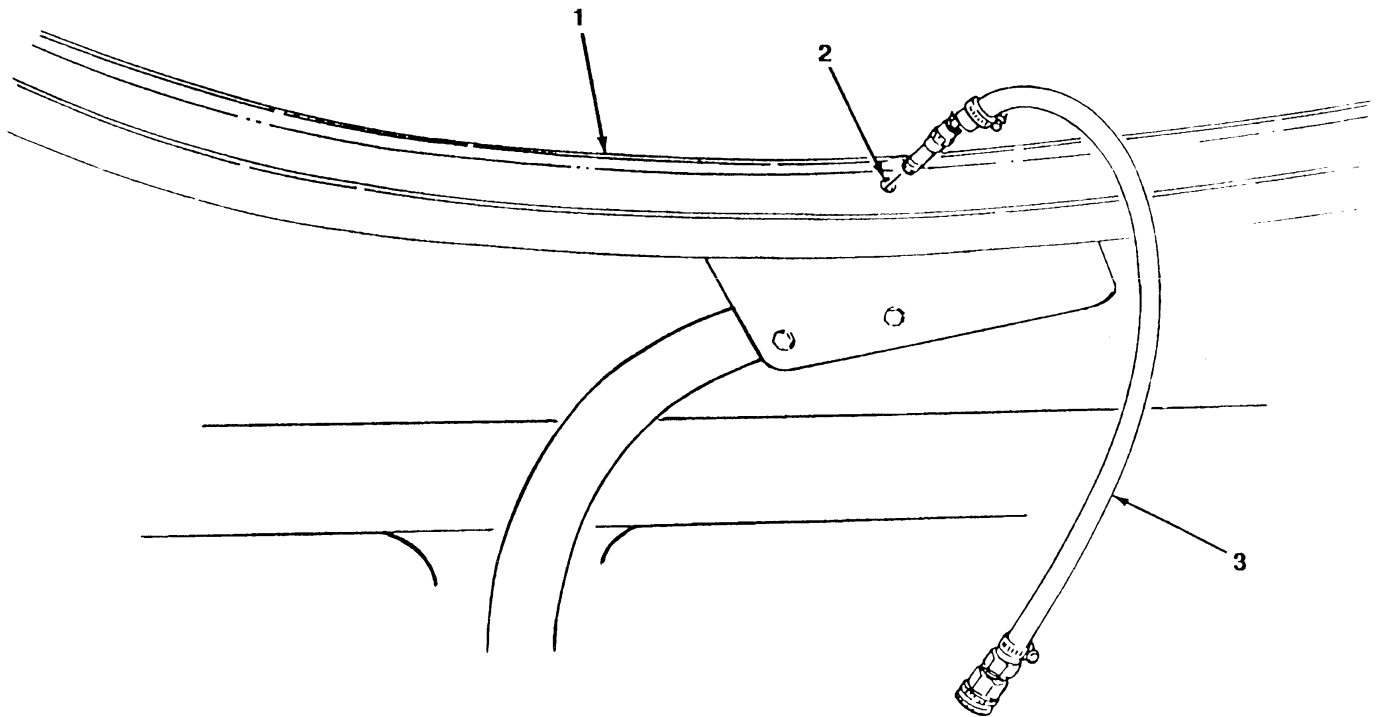


FIGURE 3-18

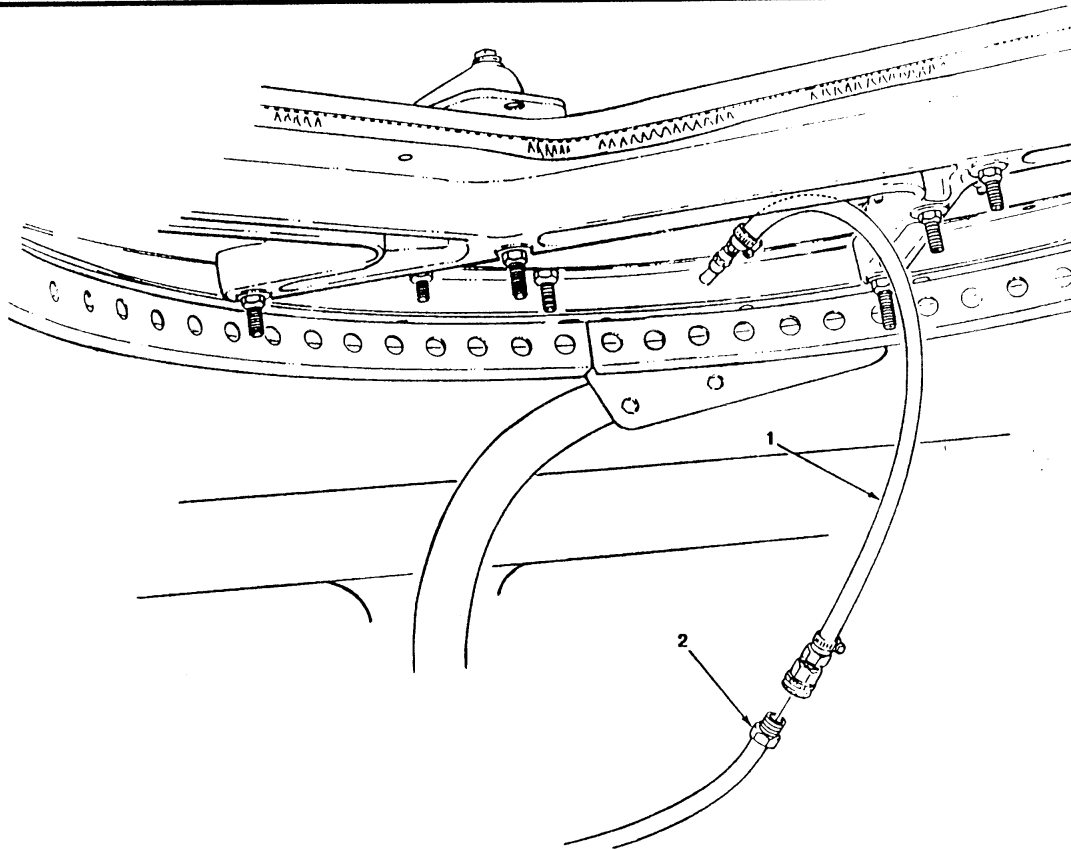


FIGURE 3-19

3-11. Tactical Trucks

MODEL:

HMMWV, M966, M1025, M1026, M1036, M1043, M1044, M1045, M1046

SUBJECT:

Turret Handle Replacement

POC:

Mr. Daniel Dudek, AMSTA-MTA, DSN 786-7416, Commercial (810) 574-7416
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DEFICIENCY:

Current design does not allow for replacement of a damaged or corroded turret handle.

COMMENTS:

A new designed turret handle has been developed which will allow the existing handle to be removed and replaced with a bolt-on handle. Below is a procedure to remove existing turret handle and install the new handle in the field using the following parts.

MATERIALS/PARTS:

Parts to be Requisitioned:

<u>NSN OR P/N</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
5310-00-241-6658	Locknut	4
5310-01-119-1024	Washer	8
5306-00-050-1237	Bolt	4
12446730	Handle	1

NOTE

The replacement handle (12446730) may not be available through the supply system yet. If you need one it can be locally fabricated using the drawings available from us. To obtain the drawings contact the POC above.

PROCEDURE:

A. Mark two reference lines (2) on weapon station (1) using existing turret handle (4) as a template. (see figure 3-16, view A)

B. Locate and mark the center of six spot-welds (3) on turret handle (4).

3-1 1. Tact. Trucks cont.

NOTE

Ensure only turret handle is drilled; do not drill through or into weapon station.

C. Drill six 0.313-inch diameter holes (3) through spot-welds in turret handle (2) marked in step "B" (see figure 3-16, view B)

D. Using a chisel, remove turret handle (2) from weapon station (1).

NOTE

Use care when grinding the weapon station to ensure the two reference lines are not removed.

E. Grind spot-welds flush with weapon station.

F. Using two reference lines (4) marked in step "A" as a guide, position Part Number 12446730 turret handle (2) on weapon station (1). (see figure 3-17, view A)

G. Using holes (3) in turret handle (2) as a template, locate, mark, and drill four 0.344-inch diameter holes (5) in weapon station (1).

H. Spot paint weapon station. (Refer to TM 43-0139.)

I. Position turret handle (2) on weapon station (1) and secure with four NSN 5306-00-050-1237 bolts(3), eight NSN 5310-01-119-1024 washers (4), and four NSN 5310-00-241-6658 lock-nuts (5). (see figure3-17, view B)

J. Spot paint bolts and nuts. (Refer to TM 43-0139).

PUBLICATIONS AFFECTED:

TM9-2320-280-20

TM9-2320-280-20P

TM9-2320-280-34P

LEVEL OF MAINTENANCE:

Unit

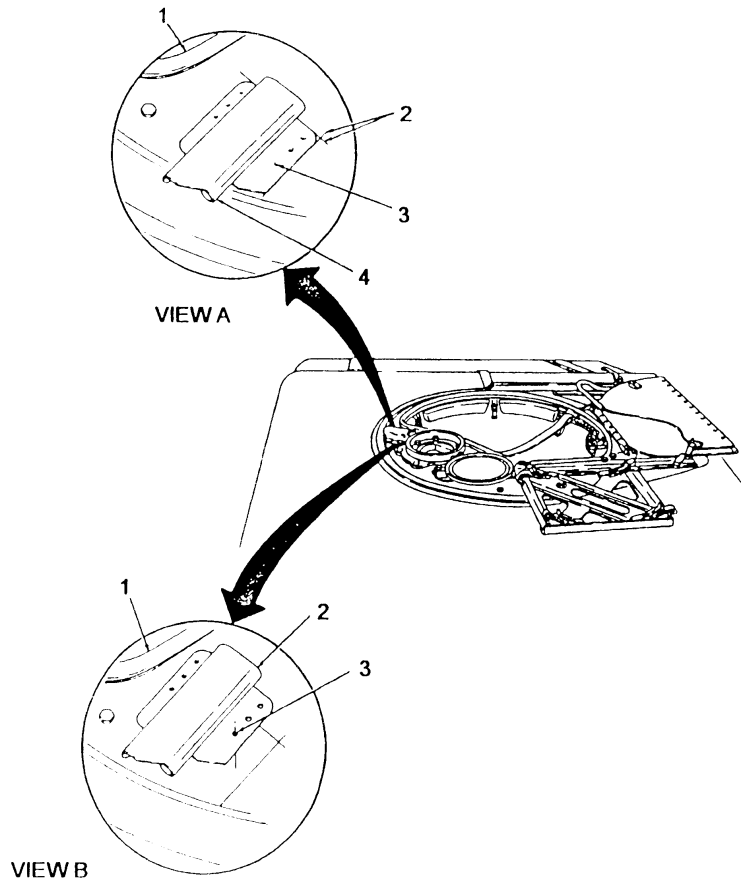


FIGURE 3-16

3-164

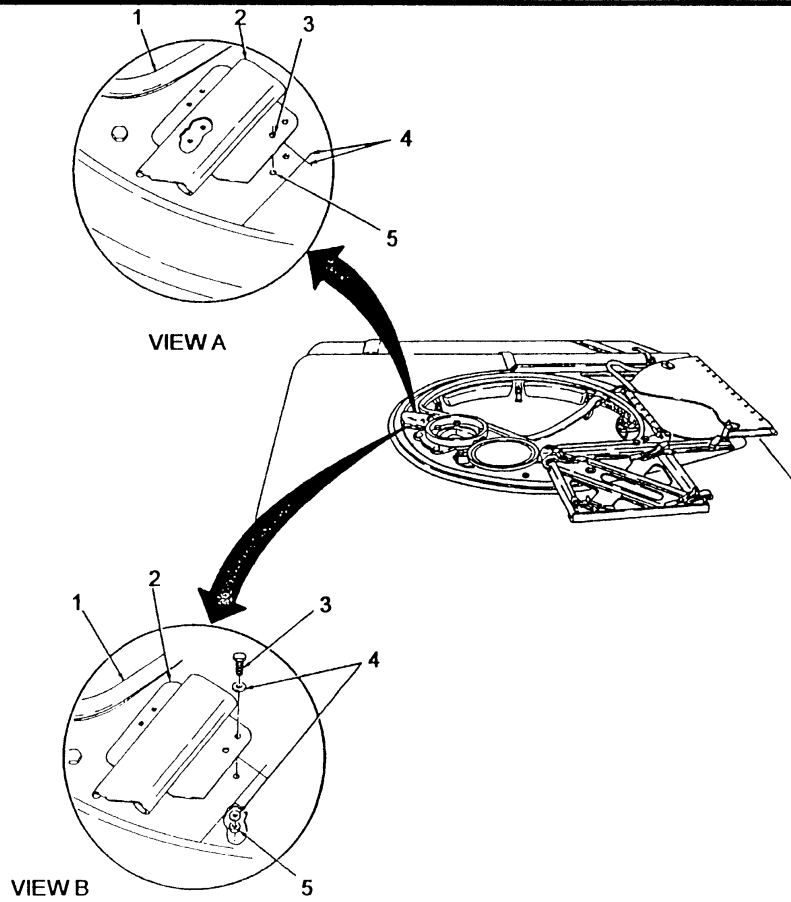


FIGURE 3-17

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3-16. Tactical Trucks

MODEL:

M966, M1025, M1026, M1036, M1043, M1044, M1045, and M1046

SUBJECT:

Weapon Station Turret Adjustment and Cleaning

POC:

Ms. Kathy Miramonti, AMSTA-MTA, DSN 786-7151, Commercial (313) 574-7151

EDITOR'S NOTE:

This is an updated article that supersedes the one published in TB 43-0001-39-3, dated 2 Dec 92. The following are the changes that were made:

- new paragraph added to Comments
- NSN was added for Adhesive Sealant
- step 17 has expanded information

DEFICIENCY:

Reports from the field indicate that some weapon station turrets do not rotate properly. Improper adjustment, or dirt has caused them to bind or stick. Technical manuals do not support adjustment procedures.

COMMENTS:

A. The following procedure has been developed to test, adjust, and clean the weapon station turret. If the weapon station turret doesn't turn freely after it's adjusted and cleaned, the turret bearing assembly will need to be replaced. Unit maintenance is now authorized to perform weapon station tray and bearing seal replacement and turret bearing replacement.

B. Until the Organizational Technical Manuals are updated, Organizational maintenance should contact their DSU for a copy of the procedures in TM9-2320-280-34 (Aug 91), paragraphs 14-2 and 14-3. Replacement parts are listed in TM9-2320-280-34P (Aug 91), figures 217 (item 4) and 220 (items 2, 9, 10, 11, and 12).

3-16. Tact. Trucks cont.**MATERIALS/PARTS:**

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QUANTITY</u>
8040-00-865-8991	Adhesive Sealant	12 oz.
5310-00-935-9021	Nut	15 ea.
8030-01-159-4844	RTV Sealant	8-1/2 oz.
5310-01-212-2303	Slotted Washer	3 ea.
5330-01-282-2213	Seal	22 ft.

PROCEDURE:**A. Weapon Station Turret Adjustment Procedure**

1. Inspect, tighten, or replace any loose, missing, or damaged parts on the weapon station turret (1) area as shown in TM9-2320-280-20. (see figure 3-25)
2. If weapon station turret rotation has not improved, loosen bolt (4) securing rear of support ring (2) to "C" pillar support bracket (3). (see figure 3-26)
3. Check the gap between the "C" pillar support bracket (3) and rear support ring (2).

NOTE

If no gap exists proceed to step 4.

If gap is the thickness of a slotted washer or greater, proceed to step 5.

4. Remove slotted washers (1), one at a time, as required, and rotate turret to check for binding. (see Figure 3-26) If there is no improvement, proceed to step 6.
5. Add NSN 5310-01-212-2303 slotted washers (1), one at a time, as required, and rotate turret to check to see if it rotates freely. If there is no improvement, proceed to step 6.
6. Loosen the eight clevis retaining bolts (3) securing front ring assembly supports (1) to windshield assembly (2). (see figure 3-27) Rotate the turret, and check to see if it rotates freely.
7. If turret rotation has improved, position adjustment slots (4) in clevis (5) where turret operates freely, and tighten eight clevis retaining bolts (3) and rear support ring bolt (6).
8. Install primary weapon system, and check operation of weapon station turret. (Refer to TM9-2320-280-10)
9. If turret rotation has not improved as a result of adjustment, remove turret bearing assembly.

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3-16. Tact. Trucks cont.

B. Turret Bearing Assembly Removal

1. Remove weapon station hatch. (Refer to TM 9-2320-280-20.)
2. Remove hinge pivot bracket and gunner's sling. (Refer to TM 9-2320-280-20.)
3. Remove gunner's sling hook. (Refer to TM 9-2320-280-20.)
4. Remove weapon station backrest pads. (Refer to TM 9-2320-280-20.)
5. Remove weapon station hatch latches. (Refer to TM 9-2320-280-20.)
6. Remove weapon station hatch tube assembly. (Refer to TM 9-2320-280-20.)
7. Remove TOW mount pedestal if installed. (Refer to TM 9-2320-280-20.)
8. Remove TOW mount pedestal cover, if installed. (Refer to TM 9-2320-280-20.)
9. Remove weapon station inclinometer, if installed. (Refer to TM 9-2320-280-20.)
10. Remove TOW MGS pan, if installed. (Refer to TM 9-2320-280-20.)
11. Remove turret lock. (Refer to TM 9-2320-280-20.)
12. Remove armament cover and seal, if installed. (Refer to TM 9-2320-280-20.)
13. Remove armament mount panel, if installed. (Refer to TM 9-2320-280-20.)
14. Remove traversing bar, if installed. (Refer to TM 9-2320-280-20.)

NOTE

Note location of attaching hardware for installation.

15. Remove three nuts (4), six washers (3), and three screws (2), securing weapon station tray (1) to bearing assembly (5). (see figure 3-28)
16. Remove weapon station tray (1) from bearing assembly (5).
17. Remove eighteen screws (3) and washers (4) securing three turret lockring sections (2) to support ring (1). (see figure 3-30)
18. Remove twelve nuts (5), twenty-four washers (2), and twelve screws (1) securing six roof retainers (6) and bearing assembly (3) to support ring (4). (see figure 3-29)
19. Remove six roof retainers (6) and bearing assembly (3) from support ring (4).

C. Bearing Assembly Cleaning Procedure.

1. Remove two seals (2) from grooves (1) in bearing assembly (4). (see figure 3-31)
 2. Remove all old sealant from grooves (1) and surface (3) of bearing assembly (4).
 3. Using high pressure water nozzle or steam directed between the races, clean ball bearings (5) in bearing assembly (4) with mild detergent.
-
-

3-16. Tact. Trucks cont.

4. Using compressed air, blow out moisture from ball bearings (5) in bearing assembly (4). (see figure 3-31)
5. Place and rotate bearing assembly on a flat surface, ensuring it rotates freely with a maximum of six lbs. pull on the outer race.
6. If bearing assembly does not rotate freely, send bearing assembly to direct support maintenance for repair and evaluation.
7. If bearing rotates freely, proceed with step 8.
8. Cut eleven feet of NSN 5330-01-282-2213 seal (1). (see figure 3-32)

NOTE

Stretch seal during installation to ensure seal is fully installed into the groove.

The broad side of new seal fits into the groove.

Ensure lubricant is not used on ball bearings, races, or seals.

9. Place bearing assembly (1) on a flat surface, apply NSN 8030-01-159-4844 RTV sealant into groove (2), and install NSN 5330-01-282-2213 seal (3). (see figure 3-33)
10. Apply NSN 8030-01-159-4844 RTV sealant onto ends of seal (1) on bearing assembly (2). (see figure 3-34)

NOTE

Allow approximately 15 minutes drying time before handling bearing assembly.

11. Turn bearing assembly (1) over, apply NSN 8030-01-159-4844 RTV sealant into groove (2), and install the remaining eleven feet of NSN 5330-01-282-2213 seal (3). (see figure 3-33)
12. Apply NSN 8030-01-159-4844 RTV sealant to ends of seal (1) on bearing assembly (2). (see figure 3-34)

NOTE

Allow one hour drying time before installation.

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3-16. Tact. Trucks cont.

D. Bearing Assembly Installation

1. Position bearing assembly (2) on support ring (4). (see figure 3-35)
2. Fill gap between bearing assembly (2) and roof (3) with NSN 8040-00-865-8991 adhesive sealant.
3. Fill front and rear roof seams (5) with NSN 8040-00-865-8991 adhesive sealant.
4. Secure bearing assembly (2) and six roof retainers (8) on support ring (4) with twelve existing screws (1), twenty-four washers (7), and twelve NSN 5310-00-935-9021 nuts (6). Tighten nuts to 37 lb. ft. (50 N•m).
5. Apply NSN 8046-00-865-8991 adhesive sealant to area where support ring (1) and roof (2) meet. (see figure 3-36)
6. Position three lockring sections (3) to support ring (1), and secure with eighteen existing screws (4) and washers (5). Tighten screws to 37 lb. ft. (50 N•m).
7. Position weapon station tray (3) on bearing assembly (4), and secure with three existing screws (1), six washers (2), and three NSN 5310-00-935-9021 nuts (5). (see figure 3-37) Tighten nuts to 37 lb. ft. (50 N•m).
8. Install traversing bar, if removed. (Refer to TM 9-2320-280-20.)
9. Install armament mount panel, if removed. (Refer to TM 9-2320-280-20.)
10. Install armament cover and seal, if removed. (Refer to TM 9-2320-280-20.)
11. Install turret lock. (Refer TM 9-2320-280-20.)
12. Install TOW MSG pan, if removed. (Refer to TM 9-2320-280-20.)
13. Install weapon station inclinometer, if removed. (Refer to TM 9-2320-280-20.)
14. Install TOW mount pedestal cover, if removed. (Refer to TM 9-2320-280-20.)
15. Install TOW mount pedestal, if removed. (Refer to TM 9-2320-280-20.)
16. Install weapon station hatch tube assembly. (Refer to TM 9-2320-280-20.)
17. Install weapon station hatch latches. (Refer to TM 9-2320-280-20.)
18. Install weapon station backrest pads. (Refer to TM 9-2320-280-20.)
19. Install gunner's sling hook. (Refer to TM 9-2320-280-20.)
20. Install hinge pivot bracket and gunner's sling. (Refer to TM 9-2320-280-20)
21. Install weapon station hatch. (Refer to TM 9-2320-280-20.)
22. Check weapon station turret adjustment. (Refer to paragraph A., steps 2 through 7.)
23. Install primary weapon system, and check operation of weapon station turret. (Refer to TM 9-2320-280-10.)
24. If weapon station turret does not rotate freely, binds, or drags during operation, bearing assembly must be removed and sent to direct support maintenance for repair and evaluation.

3-16. Tact. Trucks cont.

E. Final Note.

This inspection and cleaning procedure should be performed during the semiannual service, after desert operations, when bearing seals are found unserviceable, or when weapon station turret does not rotate freely, binds, or drags during operation.

PUBLICATIONS AFFECTED:

TM9-2320-280-10
 TM9-2320-280-20
 TM9-2320-280-20P
 TM9-2320-280-34
 TM9-2320-280-34P

LEVEL OF MAINTENANCE:

Unit

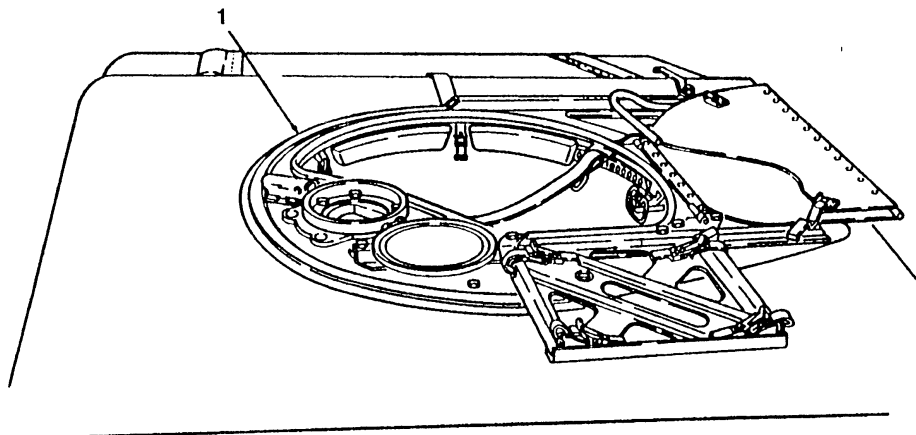


FIGURE 3-25

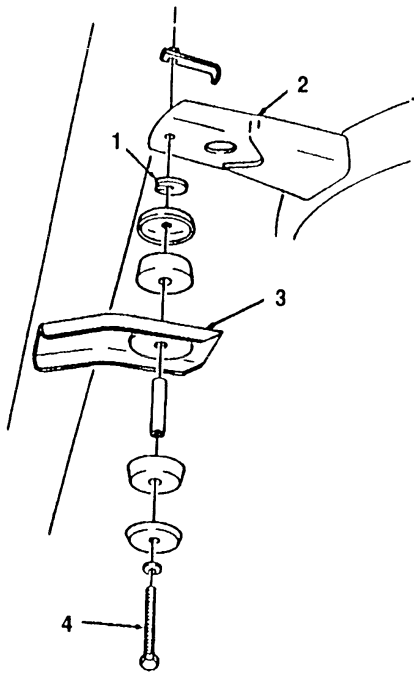


FIGURE 3-26

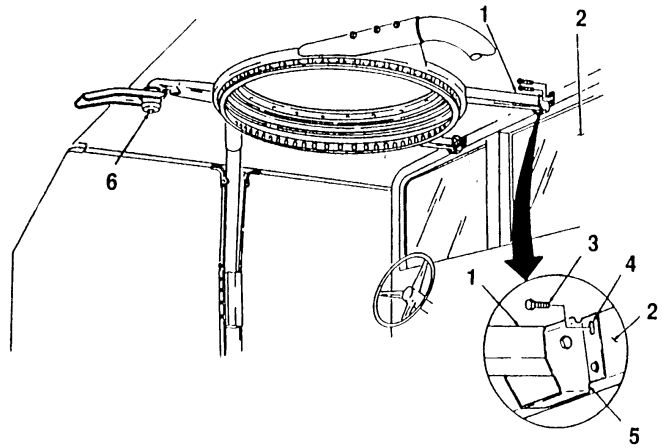


FIGURE 3-27

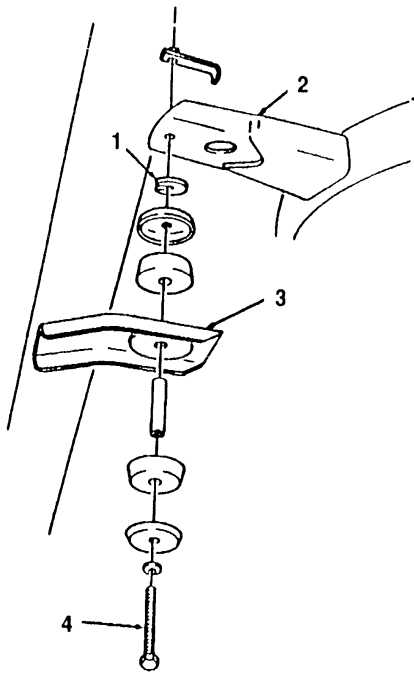


FIGURE 3-26

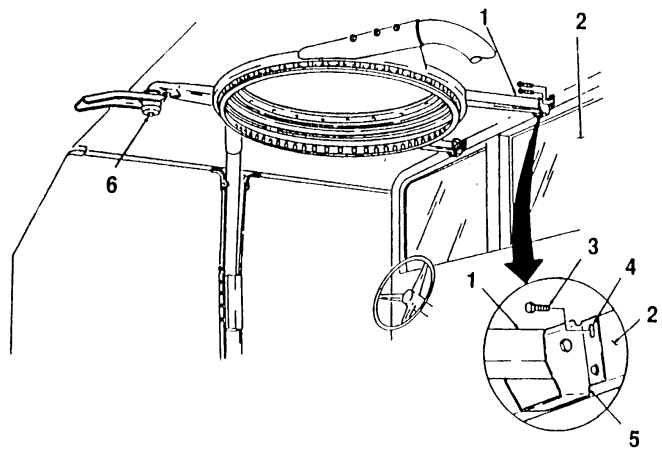


FIGURE 3-27

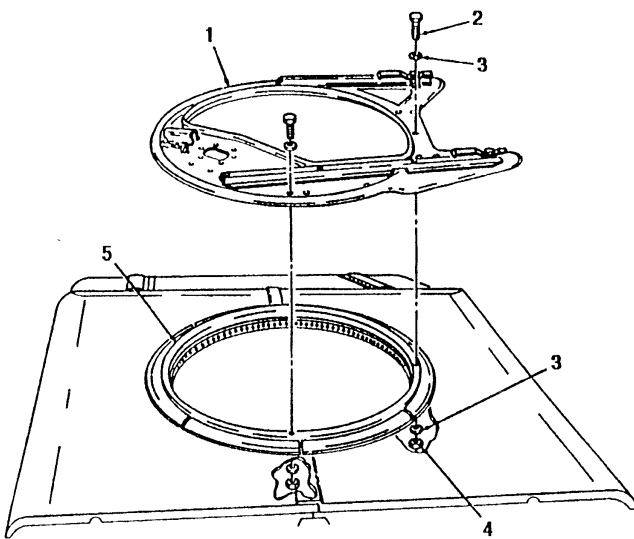


FIGURE 3-28

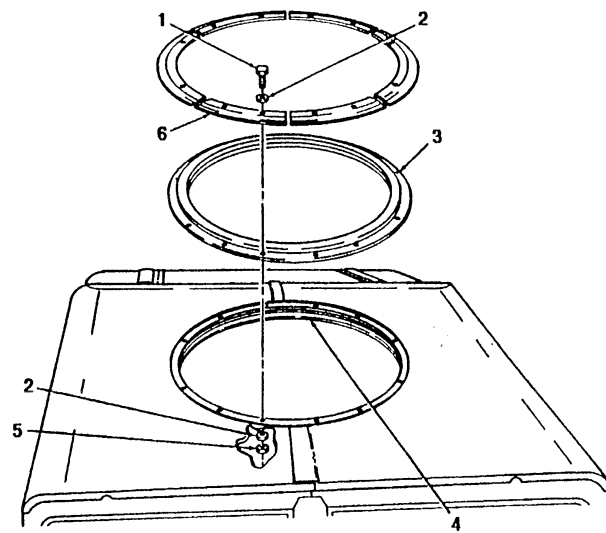


FIGURE 3-29

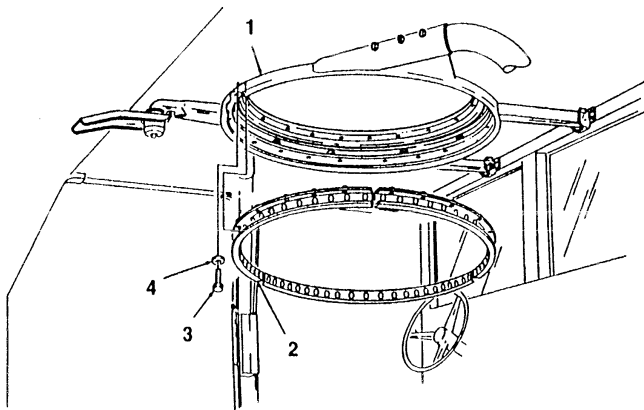


FIGURE 3-30

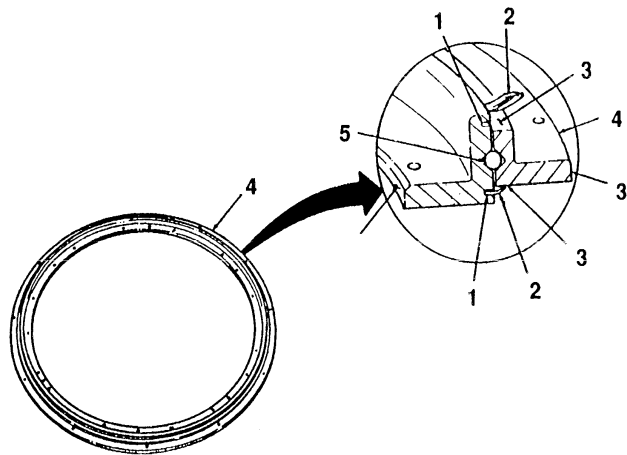


FIGURE 3-31

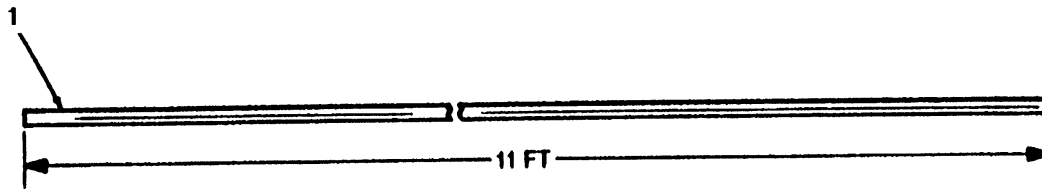


FIGURE 3-32

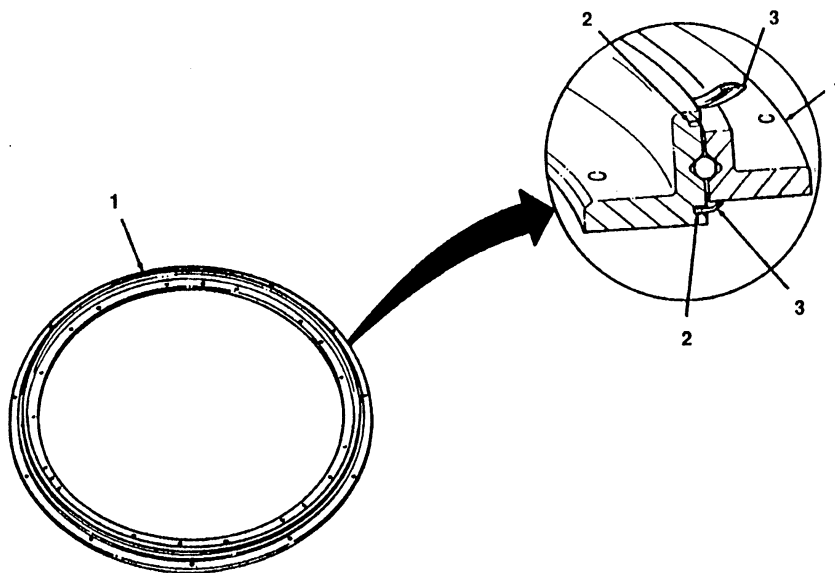


FIGURE 3-33

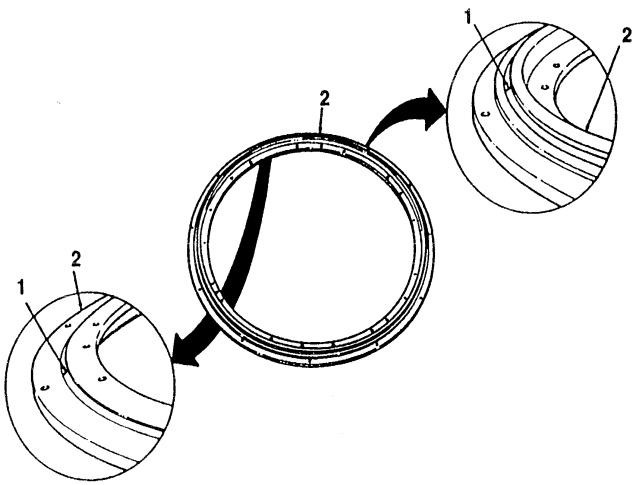


FIGURE 3-34

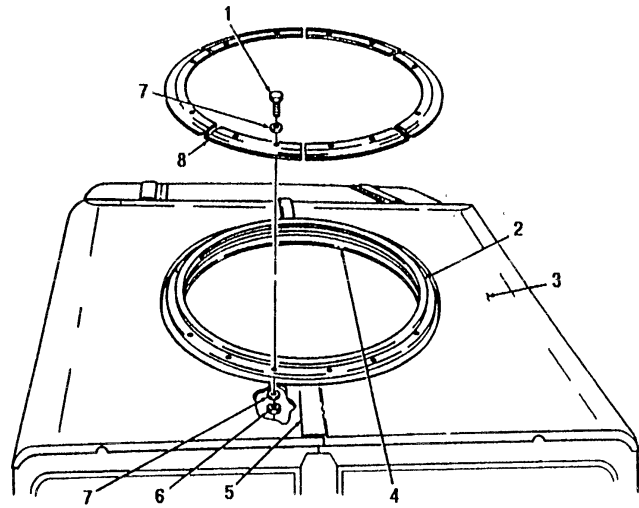


FIGURE 3-35

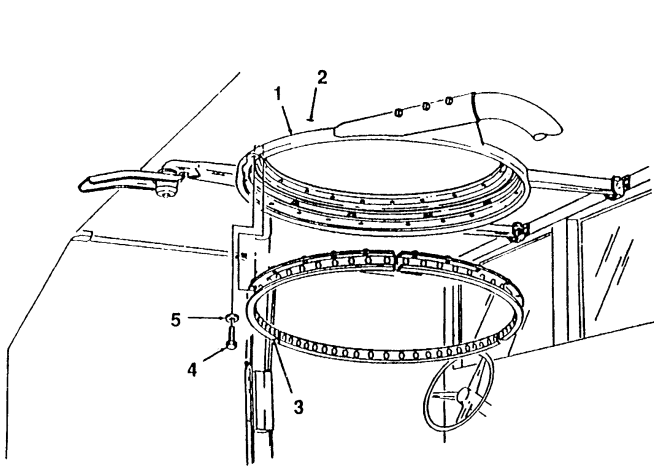


FIGURE 3-36

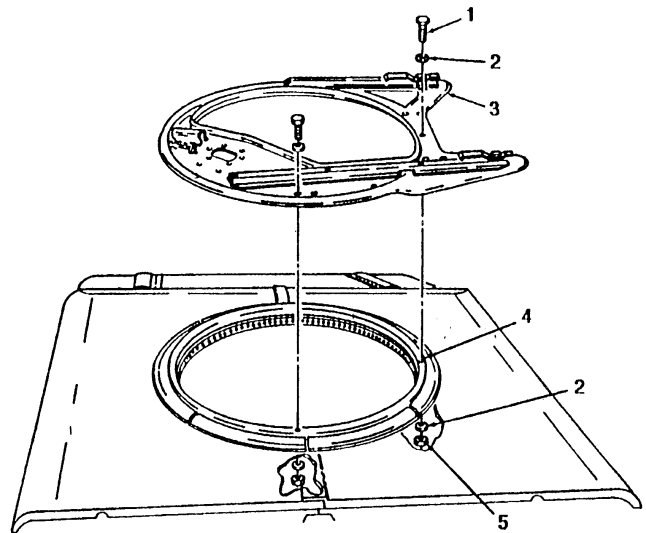


FIGURE 3-37

STRAPLESS DOOR GOES BALLISTIC

Wake sure the cloth strap is hooked up on your HMMWV's ballistic door. If it's not, the hinges, the window and the rear view mirror suffer.

The strap keeps the door from opening too wide. If it's broken or unhooked, the door can slam open, breaking hinges, the glass and the mirror.

If the strap is broken, replace it. If it's just unhooked, hook it up.



... To spray propellants and solvents on ballistic glass and plastic windows. The charge in spray can cleaners and bug sprays causes cracks in ballistic glass. Solvents can do the same thing to the glass, but they're really murder on the plastic windows.

To keep windows clear and clean, do this:

- ✓ Wash the windshield with detergent and water, using a soft, clean cloth.
- ✓ Apply hand cleaner, NSN 8520-00-782-3509, with a clean soft cloth or sponge.
- ✓ Wipe off the cleaner immediately with a dry cloth.

The hand cleaner gets rid of any dirt that soap and water won't touch. It also won't harm glass or plastic windows.

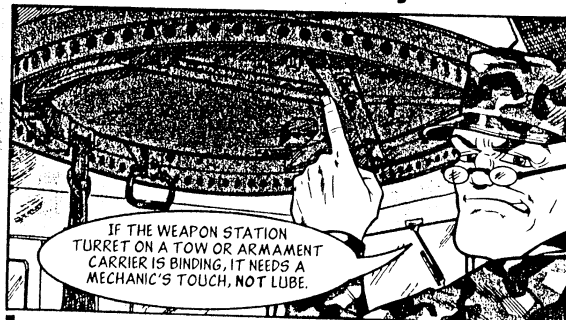
PS 497

19

APR 94

HMMWV Carrier Turrets ...

You've Got to Adjust



Lubrication ruins the bearing by attracting grit and grime, which bind the turret even more. Some lubes can even ruin the balls inside the bearing.

TM 9-2320-280-20 left out the adjustment procedures, so get a copy of EIR Digest TB 43-0001-39-3 (Dec 92). The word is on Pages 3-40 through 3-52. If you don't have the TB, contact your local TACOM Logistics Assistance Office, or write to Half-Mast.

PS 495

20

FEB 94

118-178

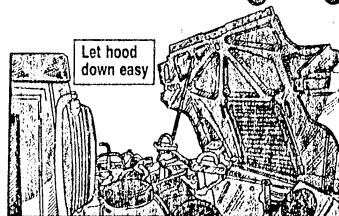


Hold HMMWV Hoods



When you release the hood support rod to close up your Humvee, do it the safe way ... let the hood down easy.

If you let it drop, you can break a headlight. Headlights cost \$12 a copy.



PS 503

18

OCT 94

Door Springs Losing Gas

HEY, WHAT THE HECK HAPPENED TO MY GAS SPRING ASSEMBLIES?

GOSH, I JUST DON'T HAVE ANY SPRING LEFT! I'M ALL OUT OF GAS. THERE'S NO BOUNCE IN MY STEP ANYMORE!

When the HMMWV's rear cargo door keeps falling on your head, it's time for new gas spring assemblies.

The door drops because the long gas spring seals don't get enough lube when the springs are in their natural position — long end up.

If the springs on your HMMWV let the door fall, get them replaced. If they're still good, your mechanic can extend their life by flopping them to put the short spring on top, and moving them to the opposite sides.

Here's how to flop the springs:

1. Be sure the forward end of the door is locked.
2. Unhook the cargo door strap and retention cables.

Unhook strap...

...and cable

3. Use a board (2 x 4 x 79 1/4 inches) to hold the door open.

Board holds door

4. Pull the four retaining rings from the rod sockets.

Remove retaining rings

5. Remove the gas spring assemblies only when the door is fully opened. If it isn't, somebody can get hurt as the springs open.

6. Flip the springs end for end and side to side.

Rods flip over and change sides

7. Put in the retaining rings and remove the board.

8. Hook up the retention cables and the cargo door strap.

This switch will show up as a maintenance task in the semiannual PMCS someday, but you can use it now with your CO's approval.

PS 512

18

S-Hook for HMMWV Step

NSN 4030-00-948-7315 gets an S-hook for the M996 and M997 ambulances' rear step assembly that's shown as Item 25, Fig 236, in TM 9-2320-280-20P. The parts information in the TM is wrong.

PS 505

7

DEC 94

18-179

HMMWV....

Keep Seal in Place

Dear Half-Mast,

The rubber weather seal on my TOW carrier's cargo shell won't stay in place. When it comes loose, dust and moisture get inside to cover and damage the TOW components.

What do I use to keep the seal in place?

SFC M.S.F.



Dear SFC M.S.F.,

First, gently remove the seal. You can reuse it unless it's torn. Then, use a clean rag and P-D-680 dry cleaning solvent to wipe off the area where the seal fits.

Remove any bits of seal from the door surface with a knife or screwdriver. Use soap and water to clean the rubber seal. Dry the seal. Then apply sealing compound, NSN 6850-01-159-4844, in the seal channel along the entire length of the seal. Press the seal back in place, and close the cargo door.

If the rubber seal is torn, replace it with NSN 5330-01-195-9083.

Half-Mast

PS 513

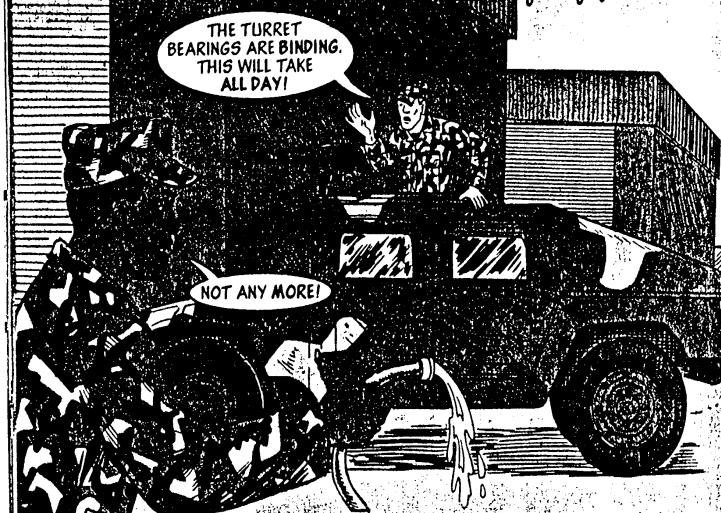
22

AUG 95

1812

HMMWV

Wash Out Turrets



Cleaning the dirt and grit from the turret bearing on an armament carrier's turret ring doesn't have to take hours. A low-pressure stream of water from a garden hose cleans the bearing just as well as eight hours of wrench-turning and lifting.

This labor-saving idea was developed by the Prototype Engineering Division at the Army's Missile Command.

Engineers added a pipe fitting and three feet of water hose to the turret ring. All the unit mechanic needs to do is connect another hose and turn on the water. A couple of spins of the turret and the bearing is cleaned out.

Machine Work Needed

You may need some help from your installation's machine shop to add the pipe fitting, though. A hole has to be drilled in the turret bearing.

Tank-automotive and Armaments Command (TACOM) has the plans for this fix. Get them by calling:

DSN 786-7416 or commercial (810) 574-7416

Or write:

Commander USA TACOM
ATTN: AMSTA-IM OPIT
WARREN, MI 48397-5000

PS 515

16

OCT 95

HMMWV

New Seats Soften Ride

Tired of your HMMWV's hard ride? Soften the seats.

NSN 2590-01-393-3796

brings a kit with the same seats that come with the new A1 HMMWVs.

You get a driver's and a commander's bucket seat with better cushions and more sitting positions than the old seat. The kits come with instructions and hardware. Unit maintenance makes the switch.

These seats won't fit in ambulances or shelter carriers—yet. An adapter kit is in the works, though.

THERE'S GOT TO BE A BETTER WAY!

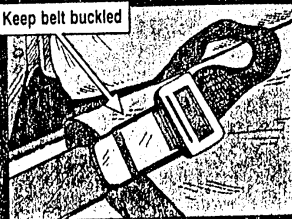


Seat Belts Draw Grit

When they're just hanging around, HMMWV seat belt buckles get packed with sand, dirt and grit. Then they won't work.

The solution is simple. Fasten the belts when they're not in use. It keeps out dirt and grit, and also keeps them from dangling in the way of feet or cargo.

Keep belt buckled



PS 513

24

AUG 95

TURRET SEAL TIP

GEE, AND I JUST REPLACED THAT SEAL, TOO.

LET ME GUESS, YOU CUT THE SEAL TO MAKE IT FIT. DIDN'T YOU?

Resist the urge to cut the weapons station turret seal on the armored HMMWV when you're trying to install it.

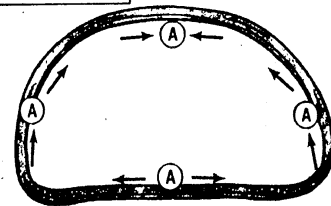
TM 9-2320-280-20P calls for 100 inches of seal, NSN 5330-01-202-8360, and that's what you need. The stuff shrinks in use just enough that you'll get leaks if you cut off too much.

Here's an installation tip from SFC John Jessee of the Michigan National Guard:

Be patient. Push in about a foot of seal at the top of the turret opening. Then work more seal in, pushing against the seal you've already installed.

It may take a couple of tries to get the seal in place, with both ends butting together, but it can be done. Once the seal's in place, you won't have any leaks caused by gaps.

Fit seal to turret in positions marked "A" ...



Leave no gap at cut

... then press seal in direction of arrows

PS 521

3

APR 96

HMMWV...

Keep Ammonia Away

If the ballistic glass in your HMMWV window is separating, it might be because you're cleaning it with ammonia.

Never clean ballistic glass with ammonia. Ammonia may be good for household windows, but it breaks down the bond between the inner and outer sections of ballistic glass.

Clean the glass like it says on Page 2-59 of TM 9-2320-280-10. Use detergent, soapy water, plastic polish or a cream cleaner. Never use any cleaning product that contains ammonia.

If the glass sections completely separate or if they cause a safety hazard by separating so much that you can't see through the glass, it's time to replace the ballistic glass.

Never substitute regular plate glass for ballistic glass, though. It offers no ballistic protection.



Give Hood a Handle

More than a few of you HMMWV drivers and mechanics have mashed a finger or hand trying to safely lower the hood.

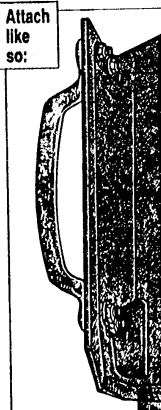
And more than a few hoods have been damaged when they've slammed shut, because you couldn't get a grip.



Solve these problems with a handle that's a snap to add, according to SFC John Shank II of Ft Campbell, KY. Here are the parts:

Item	NSN
Door handle (used on M44A1/A2-series 2 1/2-ton trucks)	5340-00-621-2591
Machine bolts (4)	5306-00-068-0513
Self-locking nuts (4)	5310-00-877-5796
Flat washers (4)	5310-01-112-6655

Attach like so:



Install the handle between the hood latch and the driver's door. Here's how:

1. Drill four 17/64-in holes, matching the handle holes, in the left side of the hood next to the latch. (Note: remove any material from the underside of the hood that will keep you from installing the hardware.)
2. Install the handle with the bolts, washers and locknuts.
3. Torque the nuts to 30 lb-in.

PS 529

5

DEC 96

Chapter 20

WINCH

Functional
Group Code
2001

3-7. Tactical Trucks

MODEL:

M1026, M1026AI, M1036, M1038, M1038AI, M1042, M1044, M1044AI, M1046, and M1046AI

SUBJECT:

6000 lb Winch Assembly Repair Procedure

POC:

Ms. Jody McInerney, AMSTA-IM-MTA, DSN 786-7346, Commercial (810) 574-7346 mcinernj@cc.tacom.army.mil

DEFICIENCY:

Due to vendor changes in part configuration, there is a lack of technical support on the 6,000 lb winch. Three areas will be addressed: winch wire rope, stage-three gear carrier assembly, and end housing assembly bushing.

COMMENTS:

The following is provided for Interim field Information, notification of minor alterations, publications changes, and advance Information on the 6,000 lb winch assembly repair procedures covering winch wire rope assembly 15667, stage-three gear carrier assembly 26781, and the end housing assembly 16013.

MATERIALS/PARTS:

Using the following NSN'S, the wire rope can be requisitioned as an assembly, or as separate parts. NSN 4010-01-315-4179 is the complete assembly; the other items are the down parts. Wire rope assembly Instructions are found in TM9-2320-280-34, Appendix C, Section II.

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
4010-01-315-4179	Wire Rope Assembly	1
4030-01-210-0691	Terminal	1
4030-01-209-7047	Hook	1
4030-00-237-8741	Clamp	1
4030-01-256-0471	Thimble	1
4010-01-231-5075	Wire Rope (MIL - W - 83420D)	100 ft

PROCEDURES:

A. Winch wire rope.

NOTE

The following instructions are for the 6,000 lb winch for separate part installation only, and should be used in conjunction with TM 9-2320-280-20-3, Para 10-104, Page 10-182.

1. For removal:

- a. After step 2, add, "remove terminal (7) from winch cable (2)". (see figure 3-3)
- b. Replace step 3 with "loosen clamp (3) securing hook (4) and thimble (5) to winch cable (2) and remove hook (4), thimble (5), and clamp (3) from winch cable (2)".

2. For Installation:

- a. Replace step I with "Install clamp (3), hook (4), and thimble (5) on winch cable (2) and secure with clamp (3)". (see figure 3-3)
- b. After step 1. add, "Install terminal (7) to winch cable (2)".

B. Winch maintenance and repair.

NOTE

The following instructions are for the 6,000 lb winch with the new part configurations only, and should be used in conjunction with TM 9-2320-280-34.

1 . Refer to TM9-2320-280-34, Chapter 15, Winch Maintenance, Winch Repair, pages 15-2 through 15-15.

2. Skip step 19 on page 15-6 If splined drive (1) and retainer ring (2) are part of stage-three gear carrier (3). (see figure 3-4)

NOTE

Replace steps 10 through 12 on page 15-8 with the following steps 10 and 11.

3-7. Tact. Trucks cont.

3. Step 10: "Inspect end housing (1) and bushing (2) for wear or damage. Replace as an assembly if worn or damaged. If end housing (1) and bushing (2) are to be reused, lubricate bushing (2) with bushing grease." (see figure 3-5)
4. Step 11: "Inspect gear teeth splines and machined surfaces of clutch ring gear (3), stage-one sun gear (4), stage-one gear carrier (5), stage-two gear carrier (6), stage-three gear carrier (8), and ring gear (7) for damage. Replace any damaged parts".
5. Skip step 5 on page 15-11 if splined drive (1) and retainer ring (2) of stage-three gear carrier (3) are assembled. (see figure 3-3)

PUBLICATIONS AFFECTED:

TM9-2320-280-20
TM9-2320-280-20P
TM9-2320-280-34
TM9-2320-280-34P

LEVEL OF MAINTENANCE:

Unit and Direct Support

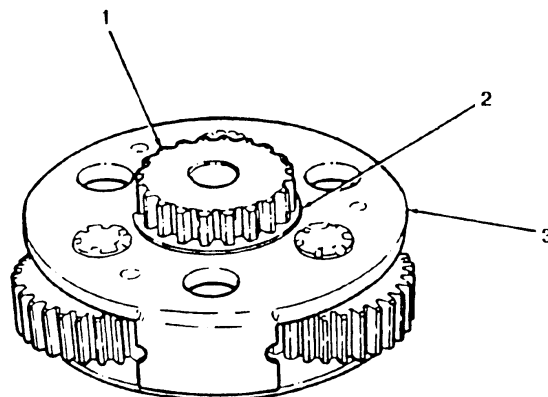


FIGURE 3-4

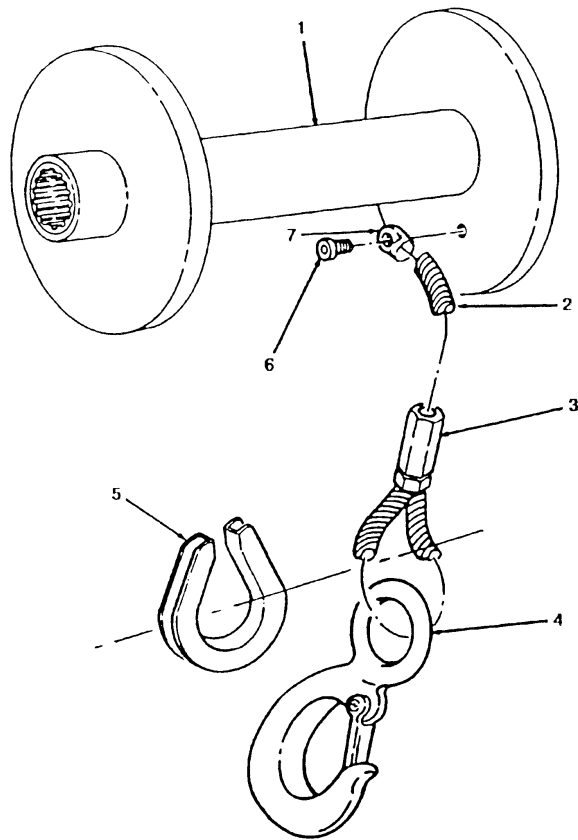


FIGURE 3-3

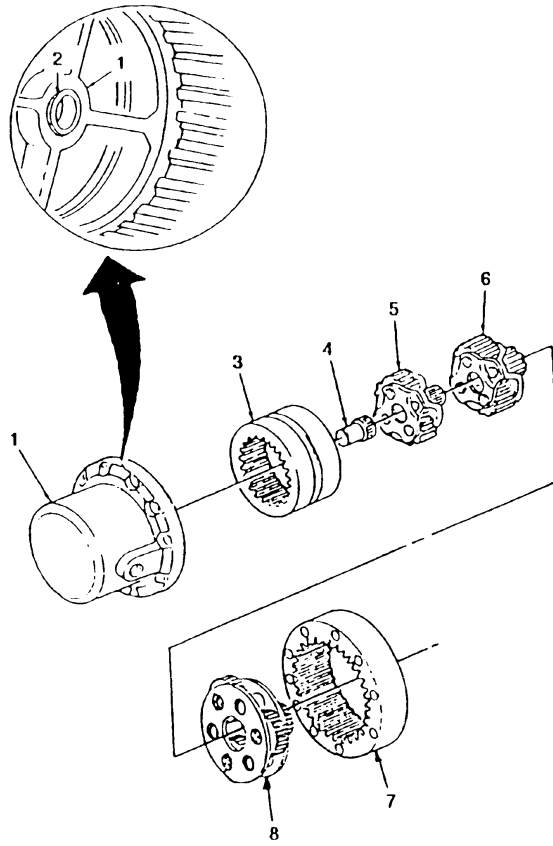


FIGURE 3-5

3-8. Tactical Trucks

MODEL:

M1026, M1026AI, M1038, M1038AI, M1042, M1044, M1044AI, M1046, and M1046AI

SUBJECT:

6000 lb Winch Ground Wire

POC:

Ms.Jody McInerney, AMSTA-IM-MTA, DSN 786-7346,
Commercial (810) 574-7346, mcinernj@cc.tacom.army.mil

DEFICIENCY:

Reports from the field indicate that corrosion on internal ground strap may cause winch to be inoperative.

COMMENTS:

Procedures have been developed to fabricate and install an external ground wire on the winch. The ground wire can be fabricated, using the following materials, parts, and procedures.

MATERIALS/PARTS:

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
5940-00-705-6708	Terminal	1
5940-00-705-6711	Terminal	1
6145-00-152-6499	Wire, electrical	6-inches

PROCEDURES:**A. GROUND WIRE FABRICATION.**

1. Install NSN 5940-00-705-671 1 terminal (3) to 6-inch piece of NSN 6145-00-152-6499 wire (2). (see figure 3-7)
2. Install NSN 5940-00-705-6708 terminal (1) to NSN 6145-00-152-6499 wire (2).

B. GROUND WIRE INSTALLATION.

1. Remove existing screw (5), washer (4), and ground cable (1) from winch motor (3). (see figure 3--8)
2. Remove existing screw (7) and washer (8) from solenoid cover (2).

3-8. Tact. Trucks cont.

3. Install ground cable (1) and ground wire (6) to winch motor (3) using existing screw (5) and washer (4). (see figure 3-8)
4. Install ground wire (6) to solenoid cover (2) using existing screw (7) and washer (8).

PUBLICATIONS AFFECTED:
TM9-2320-280-20

LEVEL OF MAINTENANCE:
Unit

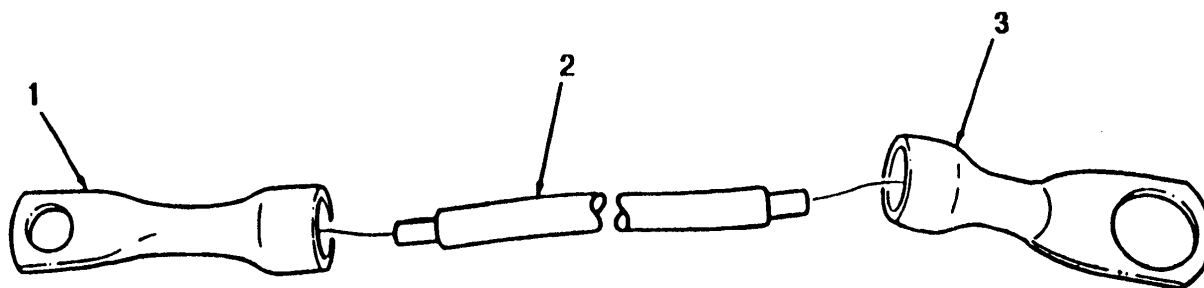


FIGURE 3-7

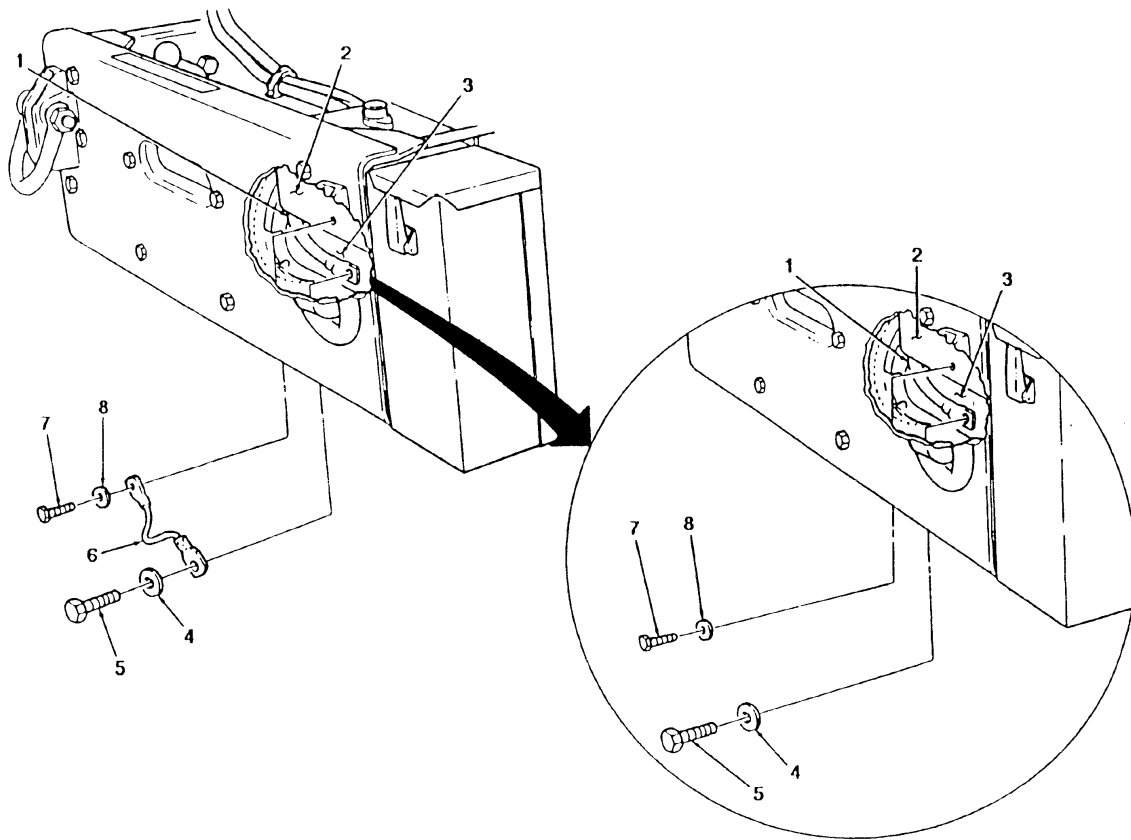


FIGURE 3-8

4-5. Tactical Trucks

MODEL:

M998 and M998AI Series HMMWV (Less M996, M996AI, M997, M997A1, M1035, and M1035AI)

SUBJECT:

9,000 lb Winch Kit

POC:

Ms. Patricia Grashik, AMSTA-IM-HLA, DSN 786-7566,
Commercial (810) 574-7566 grashikp@cc.tacom.army.mil

COMMENTS:

A 9,000 lb winch kit is available for M998 and M998AI series HMMWVs, except for the ambulance variants (M996, M996A1, M997, M997AI, M1035, M1035A1). The kit part number is (19207) 57K3217, NSN 2590-01-418-2135. This kit can replace the 6,000 lb winch currently installed on HMMWV models.

The kit includes a modified front bumper, winch, bracketry, hardware, and installation instructions.

PUBLICATIONS AFFECTED:

TM9-2320-280-24P

LEVEL OF MAINTENANCE:

Direct Support

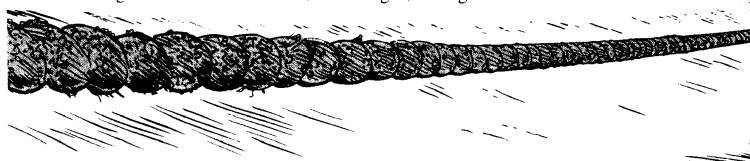


Winches, Cranes...

As common as winches and cranes are on Army equipment, you'd think wire rope would get common cleaning and lubing.

You'd be wrong.

Wire rope life is shortened by the very things that common cleaning and lubing will take care of—dust, rust and grit, among others.



Here's some PM that'll get the most out of winch and crane wire rope:

Before you do any work with wire rope, be sure you're wearing a pair of leather gloves. They'll protect your hands from broken wires.

Clean and oil winch cables after every operation. Crane cables usually stay cleaner during operation, so clean them only when they need it.

Unreel the cable and stretch it out straight. It's best if you can keep the cable off the ground so it stays clean after you've cleaned it.

Use a wire brush, like the one in the Common shop sets, to remove old lube,

Use wire brush



PS 521

dirt, and corrosion. Clean the entire cable.

Wear leather gloves to search for kinks or broken strands

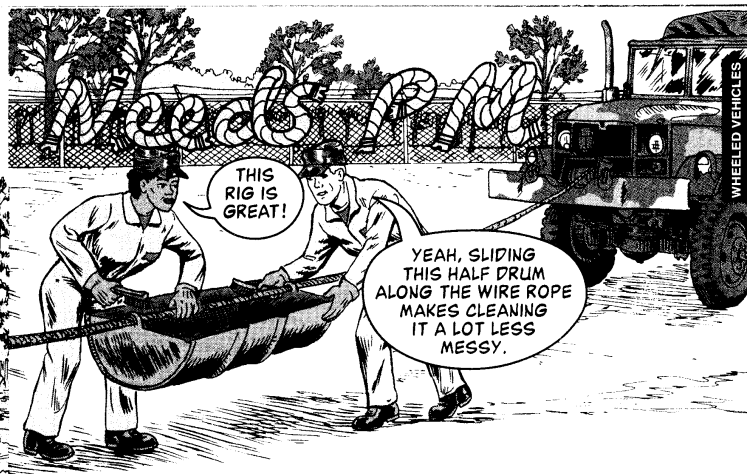


While you're cleaning, look for broken wires, kinks and other damage. Replace the cable if you find kinks. Broken wires can KO the cable, too. TM 5-725, Rigging, and TB 43-0142, Safety Inspection and Testing of Lifting Devices, as well as vehicle TMs, have details about kinks and broken wires.

For instance, some TMs call wire rope NMC if there are more than three broken wires per inch on one strand, or more than six on all strands within one inch. Also the maximum number

8

APR 96

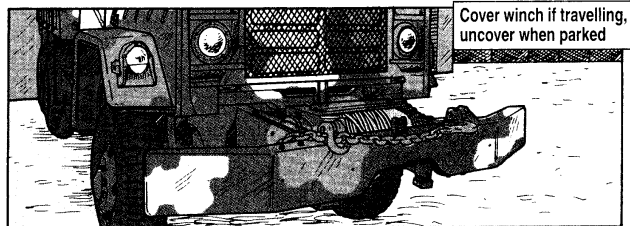


of broken wires must not occur in any two consecutive inches of rope.

Lube the wire rope according to the LO for your gear. If the LO doesn't cover it, here's what to do:

- ☞ Coat the cable with clean OE-HDO 30 engine oil if the cable gets a lot of use.
- ☞ Forget used oil. It has acid in it that weakens wires fast.
- ☞ In dry, dusty areas, the cable doesn't need oil. In fact, oil just collects more dust and dirt.
- ☞ If the wire rope isn't used much, or if conditions are damp or salty, give it extra protection with MIL-G-18458 wire rope grease. Get a 35-lb can with NSN 9150-00-530-6814.

Here's a real important point: Covering a winch is OK for travel, 'cause it keeps lots of dirt and dust (and mud) off the cable. But **don't** leave the cover on when your vehicle is parked, especially if it's parked for weeks or months at a time, because it traps moisture around the cable. That leads to the biggest killer of wire rope—corrosion.



PS 521

9

APR 96

Chapter 22

BODY AND CHASSIS ACCESSORY ITEMS

**Funtional
Group Code
2201-2202**

8-4. Tactical Trucks

MODEL:

M998, M1035, M1037, M1038, M1042, and M1097

SUBJECT:

Canvas Top and Door Seam Leak Repair

POC:

Mr. Eric Sutman, AMSTA-MTA, DSN 786-7151,
Commercial (313) 574-7151

DEFICIENCY:

Reports from the field indicate that some vinyl coated canvas tops and doors leak along seam areas.

COMMENTS:

- A. In the past, we've recommended several different sealants for use on canvas tops. We've found that NSN 8040-01-010-8758 is best suited for this purpose. It has good resistance to weathering, vibration, moisture and temperature extremes. From now on, use only NSN 8040-01-010-8758 when sealing canvas tops and doors.
- B. We've developed a seam leak repair procedure using NSN8040-01-010-8758 sealing compound. The following provides a method for on-vehicle repair of vinyl coated canvas seam areas that leak.

PROCEDURE:

- A. Locate source of leak on canvas seam.
- B. Clean canvas seam area you're going to seal. (Refer to TM9-2320-280-10).

NOTE

When performing step C, ensure to make contact between seam stitching and sealing compound by pressing sealing compound into stitching of seam.

- C. Apply a thin coat of NSN 8040-01-010-8758 sealing compound one-half inch wide over outside canvas Seam area.
- D. Allow 20 minutes for sealing compound to cure.

PUBLICATIONS AFFECTED:

TM9-2320-280-10
TM9-2320-280-20

LEVEL OF MAINTENANCE:

Unit

4-6. Tactical Trucks

MODEL:

HMMWV (4 Door Soft Tops)

SUBJECT:

Door Seals

POC:

Ms. Jody McInerney, AMSTA-IM-HLA, DSN 786-5481,
Commercial (810) 574-5481, mcinernj@cc.tacom.army.mil

COMMENTS:

if your front door seals are getting caught on your rear door hinge, causing them to rip and tear, we suspect you may have a dimension problem. This problem could be caused from a component such as the hinge, door or body not meeting specifications, a short term production line error, or a damaged component. In any case, thanks to a fellow user, here are some fixes that will eliminate the problem:

1. Since the hinge is inexpensive, you may want to try and install a new one.
2. Elongate the slots on the hinge located in the front door half.
3. Elongate the holes in the vehicle half of the rear door.
4. Remove the rear hinges, cut the weld at the rolled part of the hinge, place the bolt into the hinge to keep the same diameter and then roll the hinge in 1/8 inch, be sure to reweld the hinge at the rolled part.

PUBLICATIONS AFFECTED:

TM9-2320-280-20

LEVEL OF MAINTENANCE:

Unit or Direct Support

4-9. Tactical Trucks**MODEL:**

M998, M1038, M1097, AI and A2 (four-man soft top installed)

SUBJECT:

Fitting Vinyl Covers

POC:

Ms. Jody McInerney, AMSTA-IM-HIA, DSN 786-5481,
Commercial (810) 574-5481, mcinernj@cc.tacom.army.mil

COMMENTS:

The four-man cargo area soft top enclosure on the HMMWVs take a real beating from changing weather conditions. The covers shrink enough that the clips and velcro strips won't hold.

MATERIALS/PARTS:

<u>NSN</u>	<u>ITEM</u>	<u>QTY</u>
9510-00-596-2063	Metal Bar (.049" wall thickness on bow) AR	
9510-00-596-2066	Metal Bar (.095" wall thickness on bow) AR	
9510-00-596-2066	Metal Bar(.120" wall thickness on bow) AR	
5305-00-225-3841	Capscrew	8
5310-00-761-6882	Nut, self-locking	8

PROCEDURES:

A. Remove the support bows and cut one inch off both ends. Then re-drill the 1/4 inch bolt holes.

B. Shrunken covers should now fit fine. You've cut the problem down to size. Of course, when you do replace old covers, you'll either need new bows or modify the existing bows as follows:

- (1) Cut through bows 6 inches up from bottom of bows. (see figure 4-2)
- (2) Insert a 6 1/2-7 inch metal bar (depends on wall thickness of bow) into 6 inch piece of bow (leaving bolt hole at bottom clear).
- (3) Drill 1/4 inch hole 1 inch down from top of 6 inch piece of bow. Secure bow and metal bar with capscrew and locknut.
- (4) Butt top portion of bow up against 6 inch piece of bow. Drill 1/4 inch hole through bow and metal bar 1/2 inch up from cut line.
- (5) Remove top portion of bow.
- (6) Measure 1 inch from center of hole. Drill another 1/4 inch hole. Install capscrew and locknut.

4-9. Tact. Trucks cont.

C. Your bows are now adjustable to original height. This modification can save you money.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit

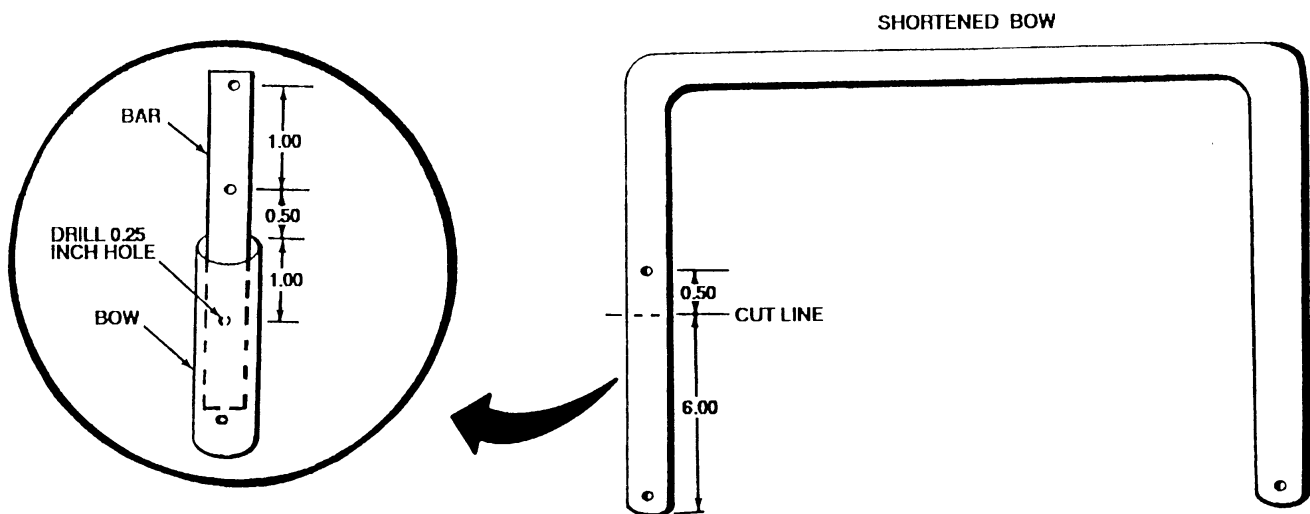


FIGURE 4-2

3-11. Tactical Trucks

MODEL:

M998, M998A1, M1038, M1038A1, M1097, M1097A1, M1035, M1035A1, M1037, M1042

SUBJECT:

HMMWV Soft Top Door Window

POC:

Ms. Jody McInerney, AMSTA-IM-HIA, DSN 786-5481,
Commercial (810) 574-5481 mcinernj@cc.tacom.army.mil

COMMENTS:

The plastic windows in the HMMWV get scratched and discolored easily resulting in unsafe conditions. Here's a method for replacing just the plastic window, instead of having to replace the entire door assembly.

PROCEDURES:

1. Make a template using figure 3-14 or cut out a window from an old door and use it.
2. Remove door handle. (Refer to TM9-2320-280-20-3, Nov 93, Paragraph 10 -13)
3. Cut at border edge of plastic, leaving zipper halves together and attached to door frame.
4. Using template cut out new window from bulk plastic (NSN 9330-00-988-1894).
5. Using a large industrial sewing machine sew in new plastic.
6. Install Door Handle (Refer to TM9-2320-280-20-3, Nov 93, Paragraph 10-13).

3-11. Tact. Trucks cont.

PUBLICATIONS AFFECTED:

TM9-2320-280-24P

TM9-2320-280-34

LEVEL OF MAINTENANCE:

Direct Support

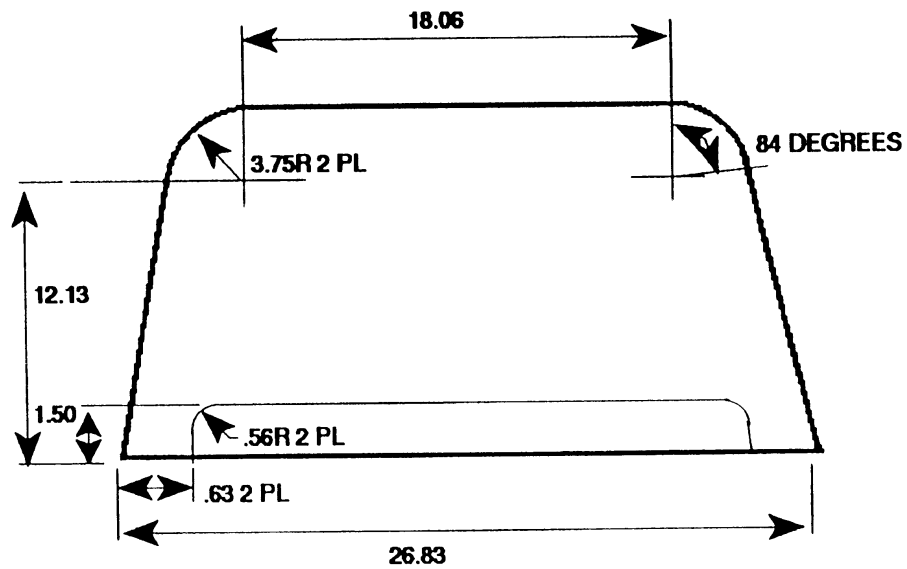


FIGURE 3-14

MODEL:

M998, M998A1, M1037, M1038, M1038A1, M1042, M1097, M1097A1

SUBJECT:

HMMWV soft top fit

POC:

Ms. Jody McInerney, AMSTA-IM-MTA, DSN 786-7346,
Commercial (810) 574-7346, mcinernj@cc.tacom.army.mil

DEFICIENCY:

Reports from the field indicate the soft top on some vehicles does not fit properly because the top cannot be positioned on front turn-button.

COMMENTS:

Procedures have been developed to relocate the soft top 'A' pillar turn-buttons as an aid to improve soft top fit. This corrective action can be accomplished in the field by using the following part:

MATERIALS/PARTS:

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
5320-01-023-2529	Blind, Rivet	4

PROCEDURES:

NOTE

This procedure is for the right turn-button relocation. The left turn-button relocation procedure is the same.

1. Move eyelet (2) and top cover (1) to gain access to "A" pillar (7). (see figure 3-4)
2. Using 0.125-inch diameter drill, remove bottom rivet (6) securing turn-button (4) to "A" pillar (7).
3. Rotate turn-button (4) 180 degrees.

3-1 1. Tact. Trucks cont.

4. Using turnbutton (4) as a template, locate, mark, and drill 0.1285-inch diameter hole (5) in "A" pillar (7). (see figure 3-4)
5. Install NSN 5320-01-023-2529 rivet (3) In turnbutton (4) and "A" pillar (7).
6. Install NSN 5320-01-023-2529 rivet (3) in existing hole (8) under turnbutton (4) and "A" pillar (7).
7. Spot paint as necessary. (Refer to TM 43-0139.)
8. Secure top cover (1) on "A" pillar (7) with turnbutton (4).

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit

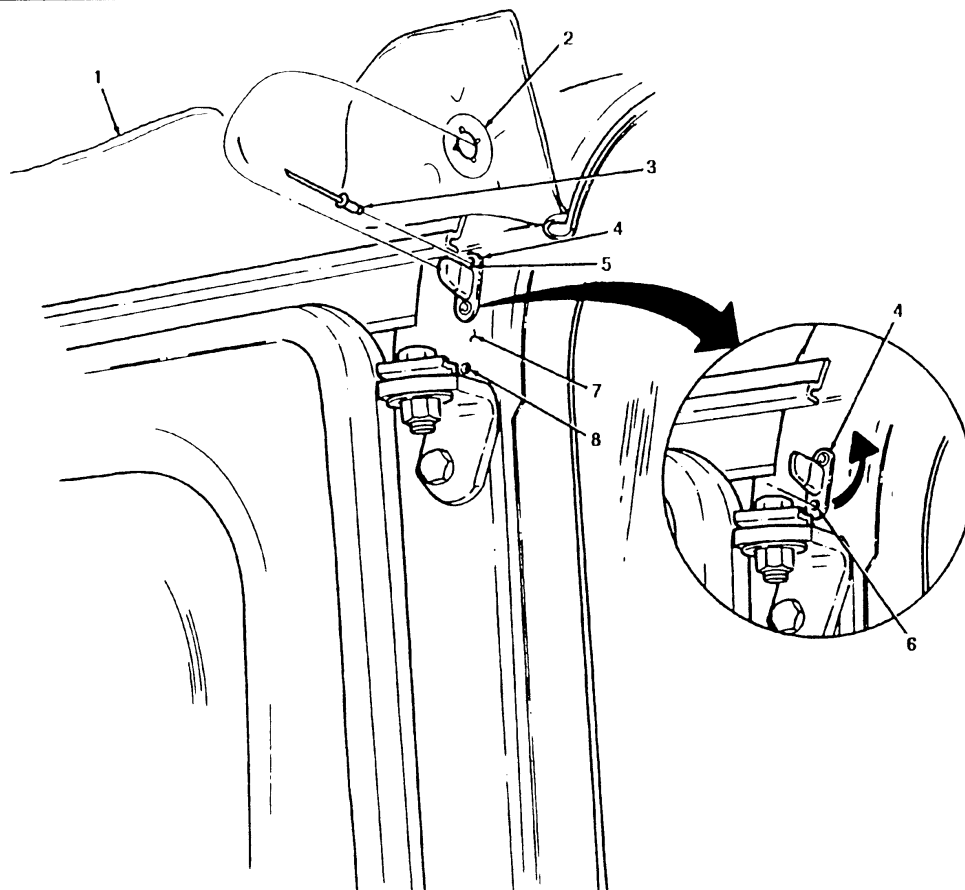


FIGURE 3-4

3-8. Tactical Trucks

MODEL:

M998, M998A1, M1035, M1035A1, M1035A2, M1037, M1038, M1038A1, M1042, M1097, M1097A1, and M1097A2

SUBJECT:

Soft Top Door Handle Repair

POC:

Ms. Jody McInerney, AMSTA-IM-MTA, DSN 786-7346,
Commercial (810) 574-7346, mcinernj@cc.tacom.army.mil

DEFICIENCY:

Reports from the field indicate that threaded insert in outer handle breaks loose, causing door handle separation.

COMMENTS:

A new procedure has been developed to repair the door handle in the field, which results in a durable, maintenance-free handle. The repair can be accomplished using the following parts and procedures.

MATERIALS/PARTS:

<u>NSN/PN (CAGE C)</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
5310-01-249-0899	Nut # 10-32	2
5310-00-014-5850	Washer # IO	1
5310-00-402-2778	Washer #IO	1
5305-00-995-3440	Screw #10-32 X 1.75	1
1032LI9-30 (07514)	Insert #10-32	1
90276A850 (39428)	Screw #10-32 X 5	1

PROCEDURES:

1. Remove screw (4), inner (3) and outer (1) door handles, washer (6). and spring (5) from door (2), if still attached. (see figure 3-6)
2. Check outer door handle (1) for insert (2), and remove insert (2), if present. (see figure 3-7)

3-8. Tact. Trucks cont.

3. Locate and drill 0.250- inch diameter hole through outer door handle (1) using insert hole (2) as a guide. (see figure 3-8)

NOTE

Countersink hole in door handle deep enough so screw head will be flush with surface of handle.

4. Using a 0.500-inch diameter drill bit, countersink outer handle (1). (see figure 3-9)

CAUTION

Use tape or drill stop to ensure the proper depth is not exceeded when counterboring, or inner door handle may be damaged.

5. Counterbore existing hole (2) of inner handle (1) to 0.238-inch diameter and 0.531-inch depth. (see figure 3- 1 0)

NOTE

Ensure smaller diameter washer is installed closest to the insert.

6. Install two NSN 5310-01-249-0899 nuts (4), NSN 5310-00-014-5850 washer (3). NSN 5310-00-402-2778 washer (2), and P/N 1032L 19-30 Insert (1) on NSN 5305-00-995-3440 screw (5). (see figure 3-1 1) Tighten washer (2) and (3), and nuts (4) against insert (1) to lock In place.
7. Using screw (4) as a driver, thread insert (2) into Inner handle (1) until bottom washer (3) seats against handle surface (5). (see figure 3-12)
8. Loosen two nuts (3) and remove screw (4), two nuts (3), and washers (2) from insert (1). (see figure 3-13)
9. Secure Inner door handle (1), existing washer (3), spring (2), and outer handle (4) with P/N 90276A850 screw (5). (see figure 3-14)
10. Measure the length of screw (2) protruding from the insert (1); record that measurement. (see figure 3-15)
11. Remove screw (3) from Inner (2) and outer (1) door handles and cut screw (3) to measurement recorded In step 10. (see figure 3-16)
12. Position washer (6) on outer door handle (1) atid Install spring (4) In the inner door handle (2). Place handles on soft-top) door (5) and secure with shortened screw (3). (see figure 3-17)
13. Check door handle for proper operation.

3-8. Tact. Trucks cont.

PUBLICATIONS AFFECTED:

TM9-2320-280-20

TM9-2320-280-20P

LEVEL OF MAINTENANCE:

Unit

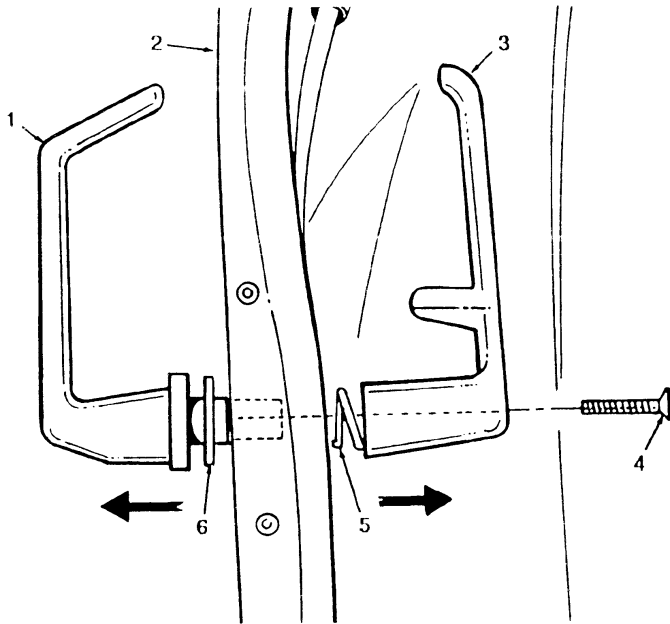


FIGURE 3-6

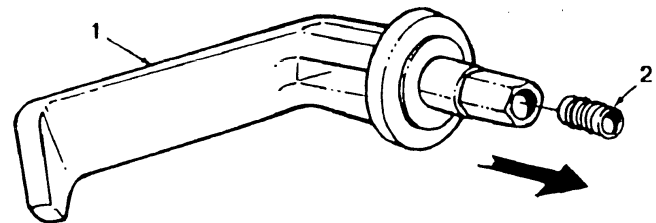


FIGURE 3-7

NOTE:
ALL DIMENSIONS ARE IN INCHES.

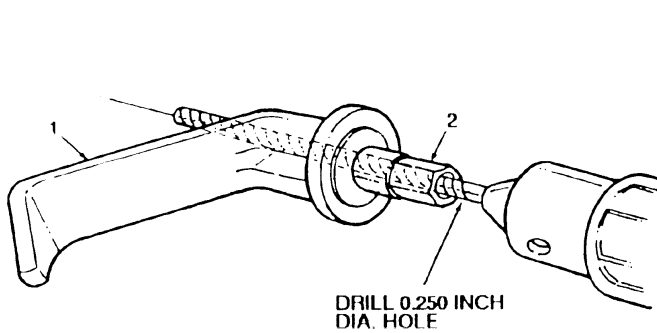


FIGURE 3-8

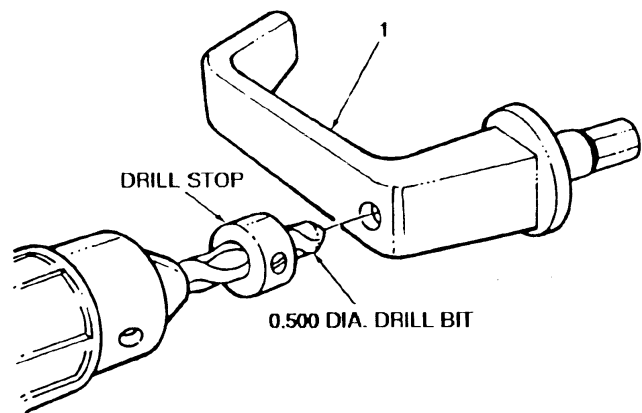


FIGURE 3-9

NOTE:
ALL DIMENSIONS ARE IN INCHES.

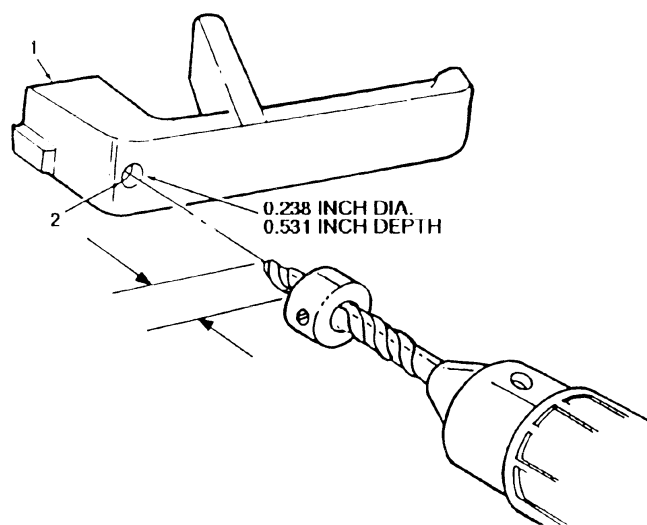


FIGURE 3-10

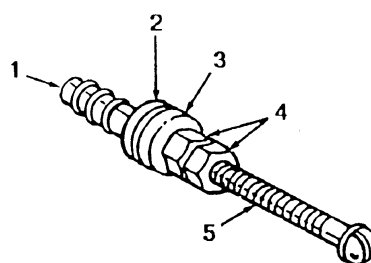


FIGURE 3-11

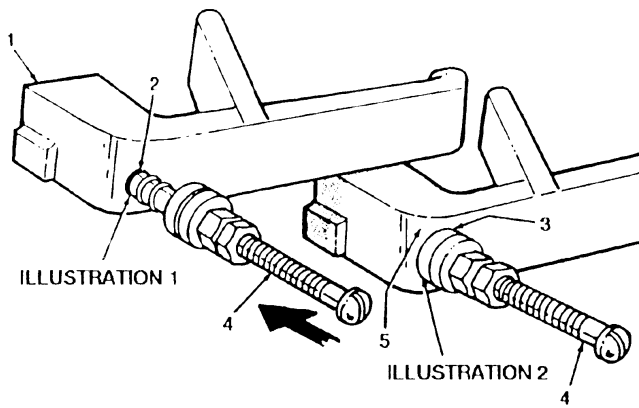


FIGURE 3-12

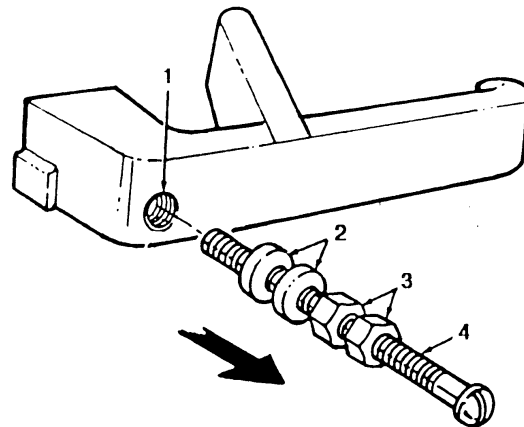


FIGURE 3-13

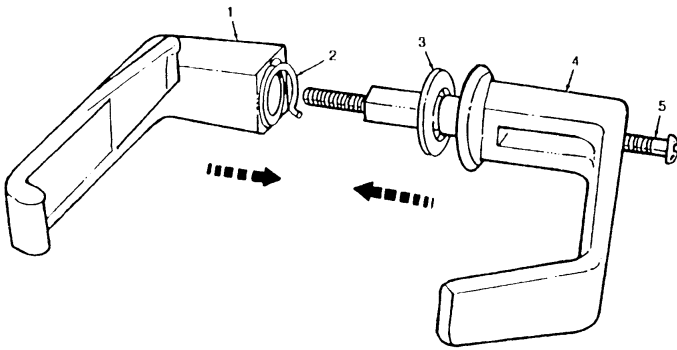


FIGURE 3-14

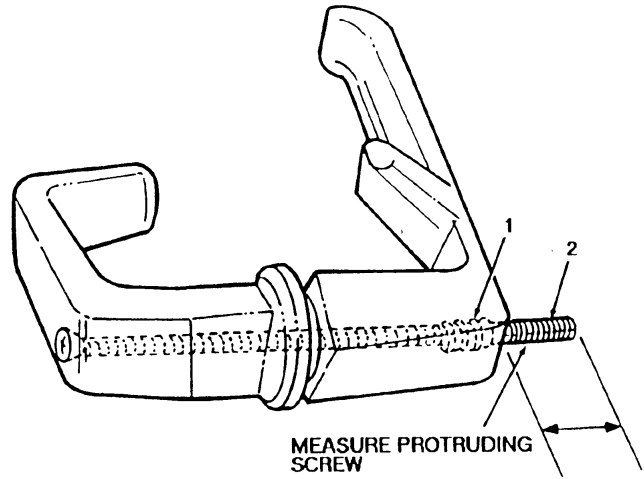


FIGURE 3-15

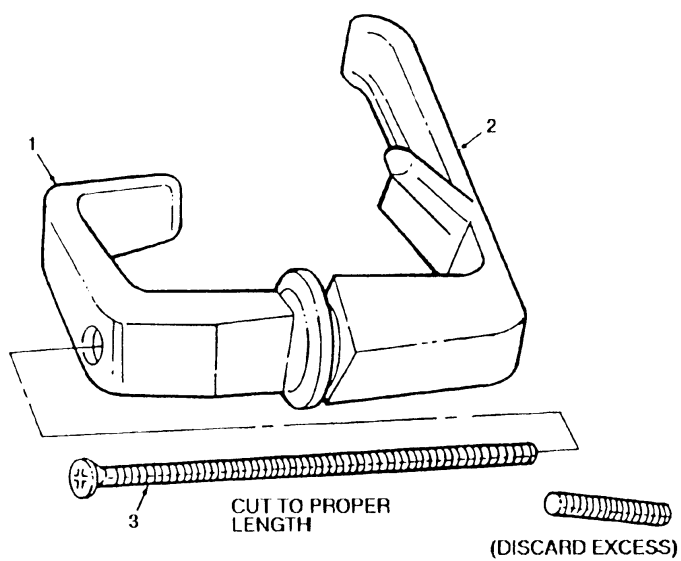


FIGURE 3-16

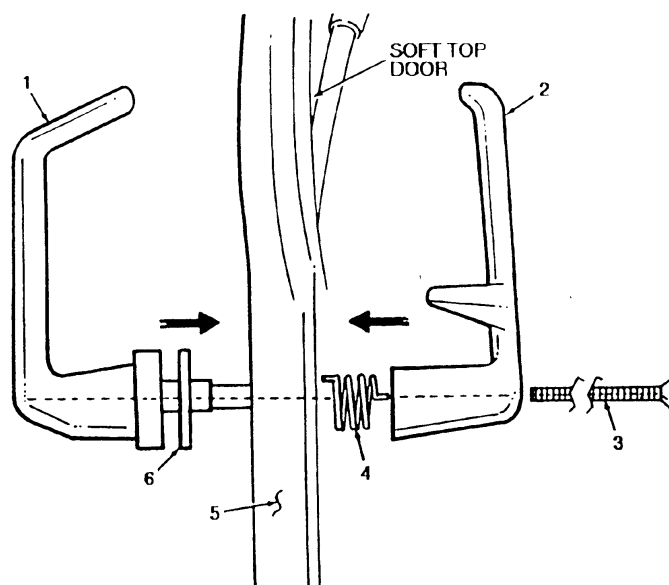


FIGURE 3-17

4-10. Tactical Trucks

MODEL:

M998, M998A1, M1035, M1035A1, M1035A2, M1037, M1038, M1038A1, M1042, M1097, M1097A1 and M1097A2

SUBJECT:

Soft Top Door Handle Repairs

POC:

Ms. Jody McInerney, AMSTA-IM-HIA, DSN 786-5481, Commercial (810) 574- 5481
mcinernj@cc.tacom.army.mil

COMMENTS:

Reports from the field indicate that the threaded insert in the outer door handle breaks loose, causing the door handle to separate. Here are some ideas you may want to try to repair the door handles. Your fellow peers developed these methods of repair and found them to work. In the future, any new field fixes for repairing the soft top door handles can be approved at your local commanders discretion.

PROCEDURES:

- A. Method One: This method involves drilling a 0.125 inch diameter hole through the inside door handle and outside door handle, then installing a spring pin (NSN 5315-01-007-8299) through the inside door handle and outside door handle. This procedure can be found in TM9-2320-280-20-3, dated Jan 96, Page 10-18, Paragraph 10-13.
- B. Method Two: This method involves drilling a hole through the outer door handle, threading a new insert into the inner handle and securing the inner and outer door handle together with screw PN (39428)90276A850. This procedure can be found in TB43-0001-39-7, dated Dec95, Page 3-11, Paragraph 3-8.
- C. Method Three: You will need to remove the old insert. Tap the hole in outer door handle (where you removed old insert from) to 5/16 inches. Install new insert (NSN 5340-00-021-3495) into the hole in outer door handle. This insert has two pins at the top. Bend these over and drive into the door handle. This keeps the insert from working loose. Install the washer, door handle spring and inside door handle on outside door handle in door frame with existing screw.

PUBLICATIONS AFFECTED:

TM9-2320-280-20-3

LEVEL OF MAINTENANCE:

Unit

4-8. Tactical Trucks

MODEL:

M998, M998A1, M1038, M1038A1, M1035, M1037, M1042, M1097, and M1097A1, M1097A2

SUBJECT:

Soft Top Door Seals

POC:

Ms. Jody McInerney, AMSTA-IM-HLA, DSN 786-5481, Commercial (810) 574-5481
mcinernj@cc.tacom.army.mil

COMMENTS:

A. It's been said that the soft top door seals fill up with water at the seam by the door handles. Is this happening to you? If yes, here is a quick and simple fix. Put three small drain holes in the bottom of the seal. This will allow the water to drain. (see figure 4-1)

B. To accomplish this task, you can use a punch, small pocket knife, or a pair of scissors. The hole should be anywhere between 1/8 to 1/4 inch in diameter. If you choose to use the knife or scissors, you may want to pinch the seal together to form a crease, then cut a half moon out.

C. To prevent water from entering again, you can apply RTV Sealant, NSN 8040-00-833-9563 to the seam by the door handle.

PUBLICATIONS AFFECTED:

TM9-2320-280-20

LEVEL OF MAINTENANCE:

Unit

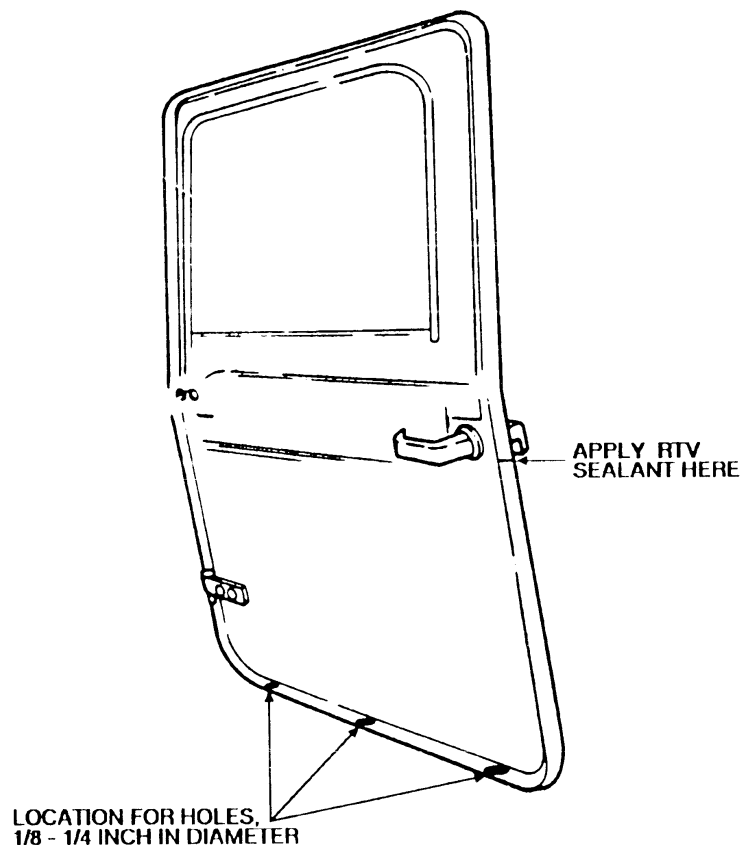


FIGURE 4-1

8-4. Tactical Trucks

MODEL:

Tactical Vehicles

SUBJECT:

Soft Top Repair/Reinforcement Procedures

POC:

Mr. Eric Sutman, AMSTA-MTA, DSN 786-7151, Commercial (810) 574-7151

DEFICIENCY:

Soft Top Enclosures rub against the support bows causing holes to develop in the enclosures.

COMMENTS:

Application of the following repair/reinforcement procedures can reduce wear and associated damage to the soft top enclosures. It will also return enclosures that are damaged to a serviceable condition at a significantly lower cost than replacing the enclosure. These procedures are offered as a guide and can be modified to meet individual needs.

MATERIALS:

<u>ITEM</u>	<u>QTY</u>	<u>NSN</u>
Canvas, Rubber, Green	1 Sq Yd	8305-00-616-0022
Grommet	6 ea	5325-00-281-8643
Turn Button	6 ea	5325-00-930-7607
Clinch Plate	12 ea	5325-00-371-8108

PROCEDURES:

Fabrication:

From the Canvas, Rubber, Green, cut the following straps:

8-4. Tact. Trucks cont

- A. STRAP A (2 ea.) - Approximately 3" wide x 12" long, fashioned to fit around the corners of the soft top enclosure. (see figure 8-1)
- B. STRAP B (4 ea.) - Approximately 4" wide x 15" long.
- C. STRAP C (2 ea.) - Approximately 36" long x 6" wide. These will serve as the securing straps and should be fashioned as illustrated in Figure 8-3.

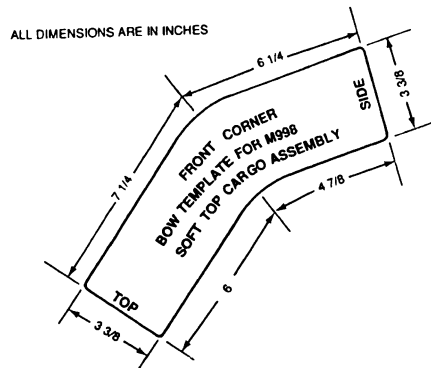


FIGURE 8-1

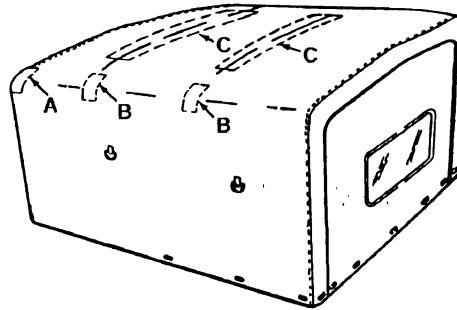


FIGURE 8-2

- D. Straps should be sewn to the Inside of the soft top enclosure. Procedures for sewing the straps onto the enclosure and securing the grommets and turn buttons to the securing straps can be found In FM I0- 16, General Fabric Repair.
- E. The top front corners of the soft top enclosure should be reinforced with strap A.(see figure 8-2)
- F. The enclosure should be reinforced with strap B where the corners of the second and third bows come into contact with the enclosure. (see figure 8-2)
- G. The securing straps C, should be sewn into the soft top where the second and third bows make contact with the soft top enclosure. (see figure 8-2) When the enclosure is installed on the vehicle, the straps should be fastened around the bows with turn buttons. The securing straps will serve to reinforce the enclosure and reduce the "ballooning" action of the enclosure which will reduce wear- between the enclosure and the bows.

8-4. Tact. Trucks cont.

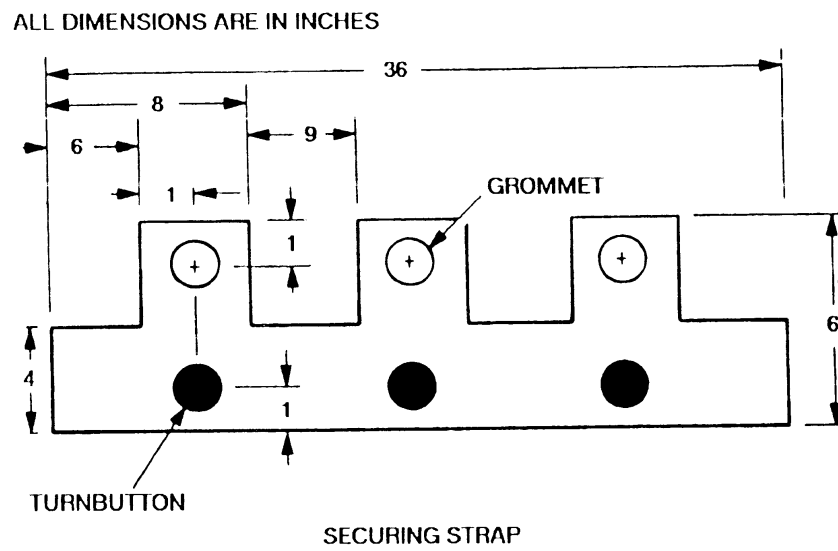


FIGURE 8-3

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Direct Support and General Support

4-12. Tactical Trucks

MODEL: HMMWV

SUBJECT:

Heater Hose

POC:

Ms. Jody McInerney, AMSTA-IM-HIA, DSN 786-5481, Commercial (810) 574-5481
mcinernj@cc.tacom.army.mil

COMMENTS:

A. It's been brought to our attention that the HMMWV heater hoses are easily torn because they get kicked and pushed around due to their location. The hoses tear by the clamps.

B. To eliminate the problem, we suggest you duct tape (NSN 7510-00-530-6375) the hose where the clamps are attached. This will reinforce the hose and protect it against the cutting action the clamps create when the hoses are being pushed and kicked.

PUBLICATIONS AFFECTED:

TM9-2320-280-20

LEVEL OF MAINTENANCE:

Unit

4-7. Tactical Trucks

MODEL:

M998 Series (HMMWV)

SUBJECT:

Heater Temperature Control Assembly

4-7. Tact. Trucks cont.

POC:

Ms. Kathy Catenaro, AMSTA-IM-MTA, DSN786-7151,
Commercial(810)574-7151 catenark@cc-tacom.army.mil

DEFICIENCY:

Heater cable binding.

COMMENTS:

If you're having problems turning the heater control off, you may want to look at the latest procedure for routing the heater cables. We're concerned that all units aren't aware of the change and may still be replacing heater cables and control valves to solve their problem. We published revised routing procedures in TB 43-0001-39-6, dated Sep 9 1. Now, you can find them in TM9-2320-280-20-3, para 10-86, dtd Nov 93.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit

8-3. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

HMMWV Standard Mirror

POC:

Ms. Patricia Grashik or Mr. Keith Barthlow, AMSTA-MTA,
DSN 786-7427/8288, Commercial (313) 574-7427/8288

COMMENTS:

Don't overtighten the round nut (NSN 5310-01-256-0416) attaching the Mirror bracket to the vehicle. You only need to tighten the nut enough to hold the bracket secure. If your screwdriver breaks while you're tightening the nut, its either too tight or the screwdriver may be defective. If you think your screwdriver is defective, or any tool for that matter, contact the GSA Quality Hotline:

GSA Quality Hotline
(703) 305-7368
FTS 365-7368
DSN 327-1996

General Services Administration
Federal Supply Service
Washington, DC 20406

PUBLICATIONS AFFECTED:

N/A

LEVEL OF MAINTENANCE:

N/A

4-6. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

HMMWV Windshield Wipers

POC:

Ms. Kathy Miramonti, AMSTA-MTA, DSN 786-7151,
Commercial (313) 574-7151

DEFICIENCY:

Reports from the field indicate users may be experiencing intermittent electrical failures to the wiper motors due to a poor connection at the contact assembly. This poor connection is the result of either corrosion of the terminals or a loose fit at the contact assembly because the grommet has deteriorated.

COMMENTS:

If you experience intermittent problems with the wiper motor on your vehicle, inspect the terminals and the rubber grommet of the contact assembly (see TM9-2320-280-20P/-34P, Figure 269). If the terminals are dirty or corroded, clean or replace as required. If the grommet shows signs of damage or deformity, replace the contact assembly (NSN 5999-01-183-9530).

PUBLICATIONS AFFECTED:

TM9-2320-280-20-1

LEVEL OF MAINTENANCE:

Unit

4-5. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Rearview Mirror Kits used on the HMMWV

POC:

Mr. Eddie Bynum, AMSTA-MTA. DSN 786-7346,
Commercial (810) 574-7346

DEFICIENCY:

Reports from the field indicated that the blind rivets used to hold the west coast style mirrors on the windshield frame are coming loose or falling out.

COMMENTS:

Tool Kit, Riveter, (D- 100-MIL- 1) NSN 5180-01-218-8234 must be used to install the blind rivet nuts (MS 27130-S43). The tool kit is issued as a special tool (TM9-2320-280-20-3, Appendix "B", Section III). Instructions for using the tool can be found in TM9-2320-280-20-3, Para. 10-63c.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Unit

3-32. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Windshield Washer Clamps.

POC:

Mr. Eric Sutman, AMSTA-MTA, DSN 786-7151

DEFICIENCY:

If the windshield washer hose clamps aren't positioned properly, when the hood closes it can flatten the clamps and hose. This keeps the windshield washer from working.

COMMENTS:

To prevent the hood from flattening the clamps and hose, the clamps should be positioned below the hood rest. TM9-2320-280-20-3, paragraph 10-61 contains procedures for windshield washer hose replacement. These procedures do not mention the proper positioning of the hose clamps. To help ensure proper positioning of the clamps, we will add the following note to the TM:

NOTE

When mounting the clamps, make sure they are positioned below the level of the hood rest so that when the hood is closed it does not interfere with the clamps or hose.

PUBLICATIONS AFFECTED:

TM9-2320-280-20-3

LEVEL OF MAINTENANCE:

Unit

3-1 1. Tactical Trucks

MODEL:

HMMWV M998 Series

SUBJECT:

Windshield Wiper Arm Spring Replacement

POC:

Ms. Patricia Grashik, AMSTA-MTA, DSN 786-7427,
Commercial (810) 574-7427

DEFICIENCY:

The spring inside the HMMWV windshield wiper arm loses its tension due to rust.

COMMENTS:

We've developed procedures for replacing the spring inside the windshield wiper arm. These procedures may be followed as an alternative to replacement of the windshield wiper arm..

MATERIALS:

Spring, helical, NSN 5360-01-282-9316.

PROCEDURES:

Visually inspect the windshield wiper arm for damage. If there is damage other than the spring being rusted and loose, replace the entire wiper arm, NSN 2540-01-212-4959. The procedures for windshield wiper arm replacement are in TM9-2320-280-20-3, Nov 93, Para 10-67, Page 10-1 16. Use the following procedure if only the spring is damaged.

NOTE

Ensure windshield wiper motor switch is in off position. Note position of wiper arm for installation.

- (1) Lift wiper arm (1) away from windshield. (see figure 3-17)
- (2) Lift up latch (2) at base of wiper arm (1) and remove wiper arm (1) from splined shaft (3).
- (3) Remove spring (5) from wiper arm (1). Discard spring (5).

3-1 1. Tact. Trucks cont.

4) Install spring NSN 5360-01-282-9316 in second hole of wiper arm tab (4).

(5) Ensure wiper arm latch (2) is unlocked.

NOTE

With motor switched off (parked position), mount wiper arm approximately 60° to vertical centerline, so that a sweep of approximately 120° will be achieved in operation.

(6) Install wiper arm (1) on splined shaft (3).

(7) Check windshield wiper for proper operation.

PUBLICATIONS AFFECTED:

TM9-2320-280-20-3

LEVEL OF MAINTENANCE:

Unit

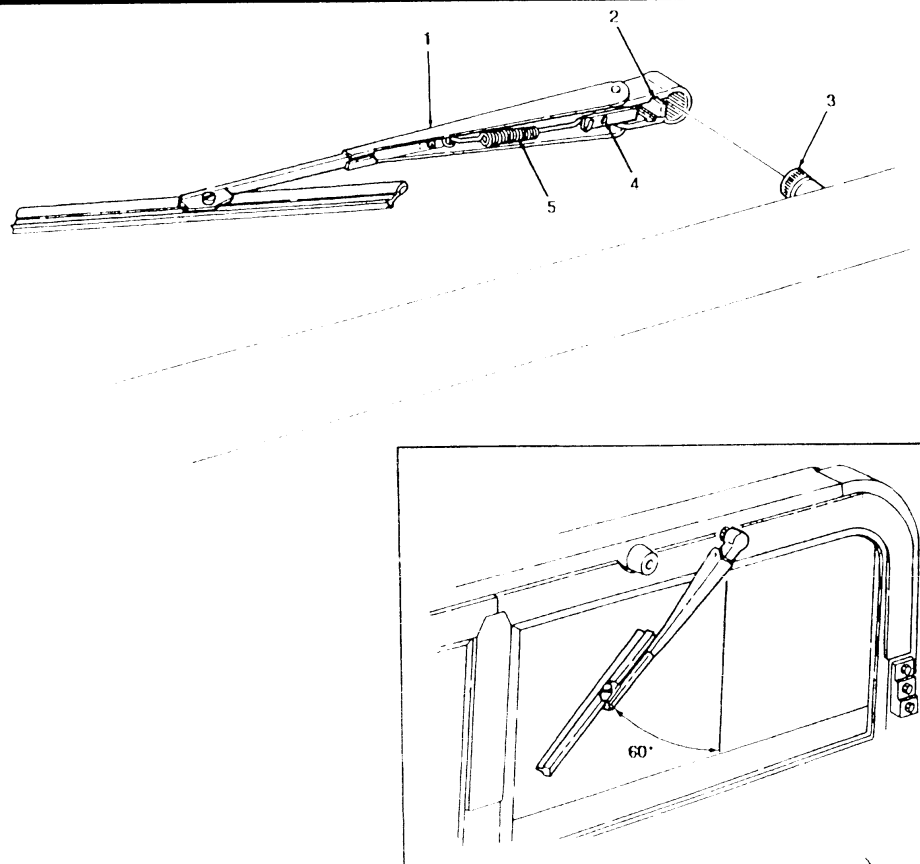


FIGURE 3-17

4-5. Tactical Trucks

MODEL:
HMMWV

SUBJECT:
Windshield Wiper Knob

POC:
Ms. Jody McInerney, AMSTA-IM-HLA, DSN 786-5481, Commercial (810) 574-5481
mcinernj@cc.tacom.army.mil

- COMMENTS:**
- A. We discovered the demand on the windshield wiper knob is high. We suspect the problem is the spring clip is bent down too far causing it not to lock onto the shaft. Resulting in the knob falling off easily and getting lost.
- B. To check, pull on the knob. If it slides on the shaft, it's too loose. Remove the knob by depressing the spring clip and pulling the knob off simultaneously. Bend the spring clip upward. It doesn't take much movement to fix it. Install the knob back onto the shaft and test by pulling on the knob again. It shouldn't slide on the shaft. (see figure 4-1)
- C. The knob fits the older model wiper motor too. But, because the shaft is slightly smaller, you will need to bend the spring clip a little more.

PUBLICATIONS AFFECTED:
TM9-2320-280-20

LEVEL OF MAINTENANCE:
Unit



FIGURE 4-1

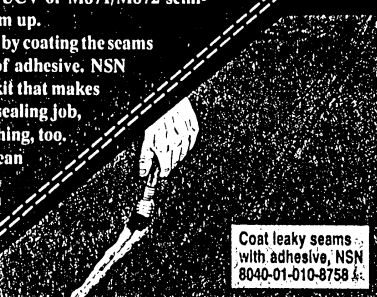
Cargo Covers

Seal Seepy Seams

When leaky seams let water through the plastic-coated tarps on your HMMWV, CUCV or M871/M872 semi-trailers, it's time to seal them up.

You can put a stop to leaks by coating the seams with a 1/2 inch wide strip of adhesive. NSN 8040-01-010-8758 brings a kit that makes 11 bunces. To complete the sealing job, press adhesive into the stitching, too.

Make sure the tarps are clean before applying the adhesive. Let adhesive cure for 20 minutes.



Coat leaky seams with adhesive, NSN 8040-01-010-8758.

PS 505 11 DEC 94

HMMWV ...

HEATER UPDATE

THIS HEATER MOTOR IS SHOT! I GUESS I'LL HAVE TO REPLACE THE WHOLE ASSEMBLY.

GOOD NEWS! NOW YOU CAN GET INDIVIDUAL PARTS FOR THE HEATER. HERE'S WHAT'S AVAILABLE...




HMMWV ...

Make Heater Hoses

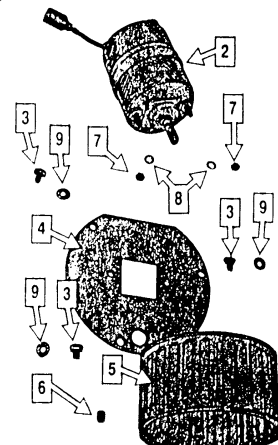
REPAIRING CRACKED OR WORN HEATER INLET HOSES ON YOUR HUMVEE IS QUICK AND EASY IF YOU HAVE THE PARTS.

The hoses, Item 4 in Fig 274 of TM9-2320-280-20P, are made from bulk hose, NSN 4720-00-241-4435. You can cut it easily into the 2 1/2-in pieces you need.



Cut your own hoses

You'll also want to replace any broken or worn-out hose clamps with NSN 4730-01-088-7798.

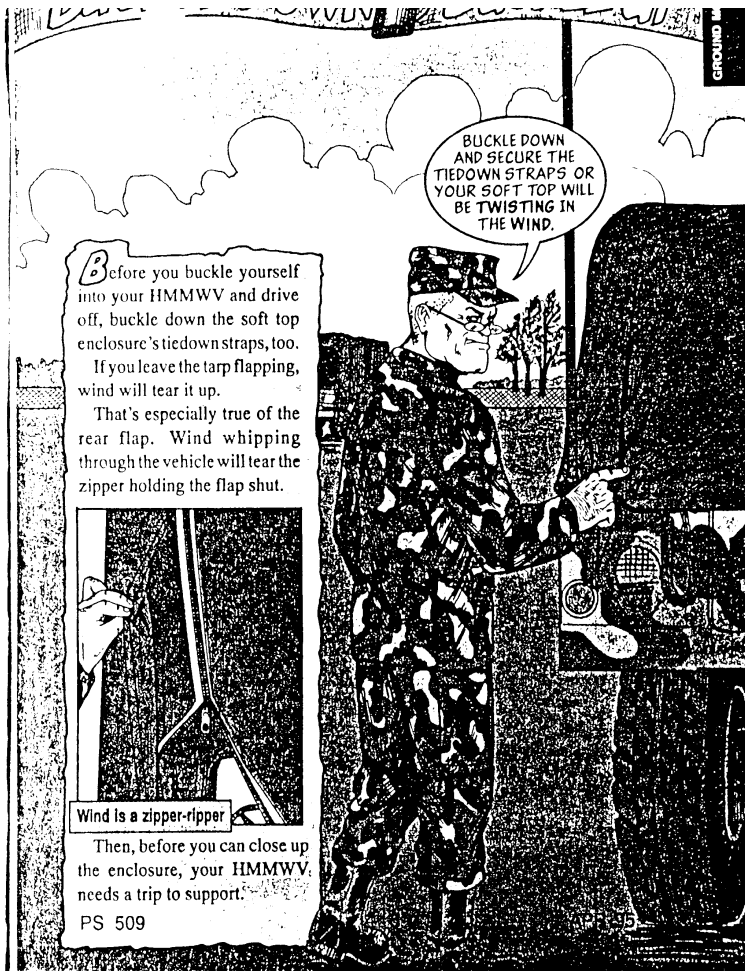


Item	Description	NSN	QTY
1	Motor & Fan	6105-01-211-6635	1
2	Motor	6105-00-512-9225	1
3	Screw	5305-01-380-9163	3
4	Mounting plate	5340-01-381-2248	1
5	Fan	2930-01-385-9108	1
6	Set screw	5305-00-724-5812	1
7	Nut, No. 10-32	5310-00-934-9751	2
8	Lock washer	5310-00-576-5752	2
9	Flat washer	5310-00-014-5850	3

Make a note, because Change 2 to TM 9-2320-280-20P, which just went to print, is wrong, too.

5

DEC 94



2001 TIGHTEN LOOSE HANDLES

Dear Editor,

The HMMWV door handle assembly on the soft side vehicles (M998, M1035, M1037, M1038 and M1042) comes apart frequently.

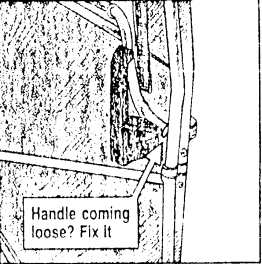
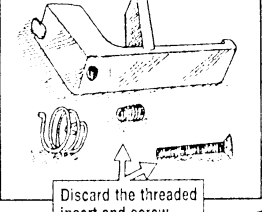
There is a fix in the TACOM EIR Digest TB 43-0001-39-3 (Oct 90), but I've found an easier way.

I take the handle apart and discard the threaded insert and screw. Using the drill, NSN 5130-00-293-1849, from the Common shop sets, I drill a 1/8-in hole in the center of the inner door assembly. The hole should be 1 inch deep.

Then, I assemble the handle and fasten it all together with one 2 1/4-in drywall screw.

I've been doing this for quite some time. It works so well, I decided to share the idea.

Harvey G. Hoff
Lebanon, OR

FROM THE DESK OF THE Editor

Thanks for sharing your idea, Sir. We've gotten the same fix from others. In any case, the truck headshed (TACOM) has evaluated all fixes, and still believes the one on Pages 3-17 through 3-21 of TB 43-0001-39-3 (Oct 90) is best and easiest.

HMMWV...

Spring for Wiper Repair

Before you replace a windshield wiper arm on a HMMWV, mechanic, eyeball the spring.

Rust causes a spring to freeze up or lose its tension. Then the wiper won't wipe dry.

If the problem is a bad spring, replace it with NSN 5360-01-282 9316. This spring is the same as the one in the door latch.

The spring costs about \$1.50. The whole arm is \$7.50.

Replace a spring like so:

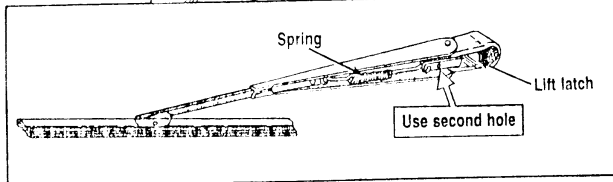
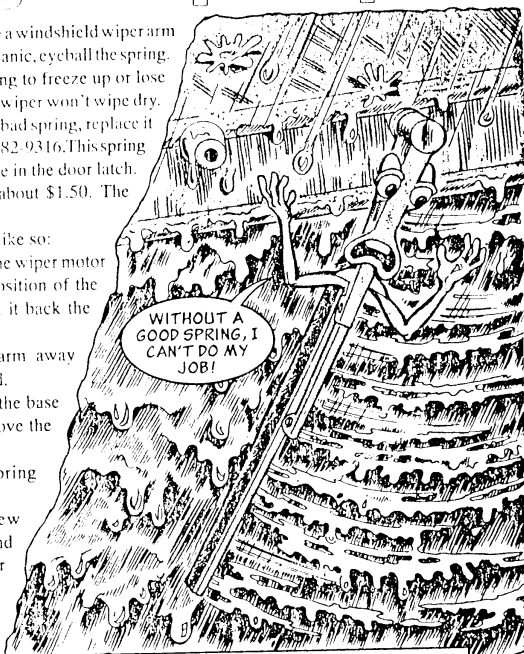
△ First, turn OFF the wiper motor switch. Mark the position of the arm so you can put it back the same way.

△ Lift the wiper arm away from the windshield.

△ Lift the latch at the base of the arm and remove the arm.

△ Remove the spring and toss it.

△ Install the new spring in the second hole of the wiper arm. Make sure the wiper arm latch is unlocked.



△ Mount the wiper arm about 60° to vertical, so you can get a total arm sweep of 120°.

PS 507

4

FEB 95

Bushing Saves Wiper Arm

Dear Editor,

When a bushing on the HMMWV's windshield wiper motor connecting arm failed, we had to replace both arms to fix it—a cost of almost \$12.

Our local TACOM Logistics Assistance Representative (LAR) helped us track down a bushing for the arm that costs only \$1.

The bushing is NSN 3120-01-388-1527. You just press it into the shaft to install it.

CW2 Danny Barlow
SGT Darrell Mealer
2/327th INF
Ft Campbell, KY

NOT AGAIN!
LAST TIME THE
BUSHING FAILED, IT COST US 12
DOLLARS TO REPLACE BOTH
WIPER ARMS

THERE'S
GOT TO BE A
CHEAPER
WAY

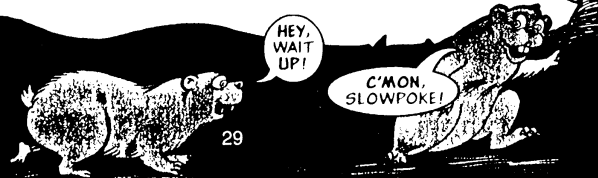


FROM THE DESK OF THE Editor

Good work. A small part, but a big savings. The bushing on the other end of the arm is PN S-3076, CAGE 82484. Order it on DD Form 1348-6.

PS 519

29



Wheeled Vehicles ...

Tape the Bows

Dear MSG Half-Mast,

My unit had trouble with the bows and canvas on our vehicles rubbing together. Surprisingly, the rubbing wore the corners of the bows, causing rust on metal and holes in wood.

We solved that problem by wrapping the corners of the bows with duct tape.

'Course, we also keep a look-out for holes in the canvas.

SFC Billy Britt

ALARNG

Dear Sergeant Britt,

Now that's an idea worthy of a bow.

Half-Mast

PS 508

24

MAR 95

Page 22-37

Page 22-37 Continued ---->>

Clean Windows Right



Those plastic windows in your soft-top HMMWV's doors can't stand up to abrasive cleaners and still do their job. The wrong stuff will scratch the plastic or turn it cloudy.

Here's how to keep windows clean and clear:

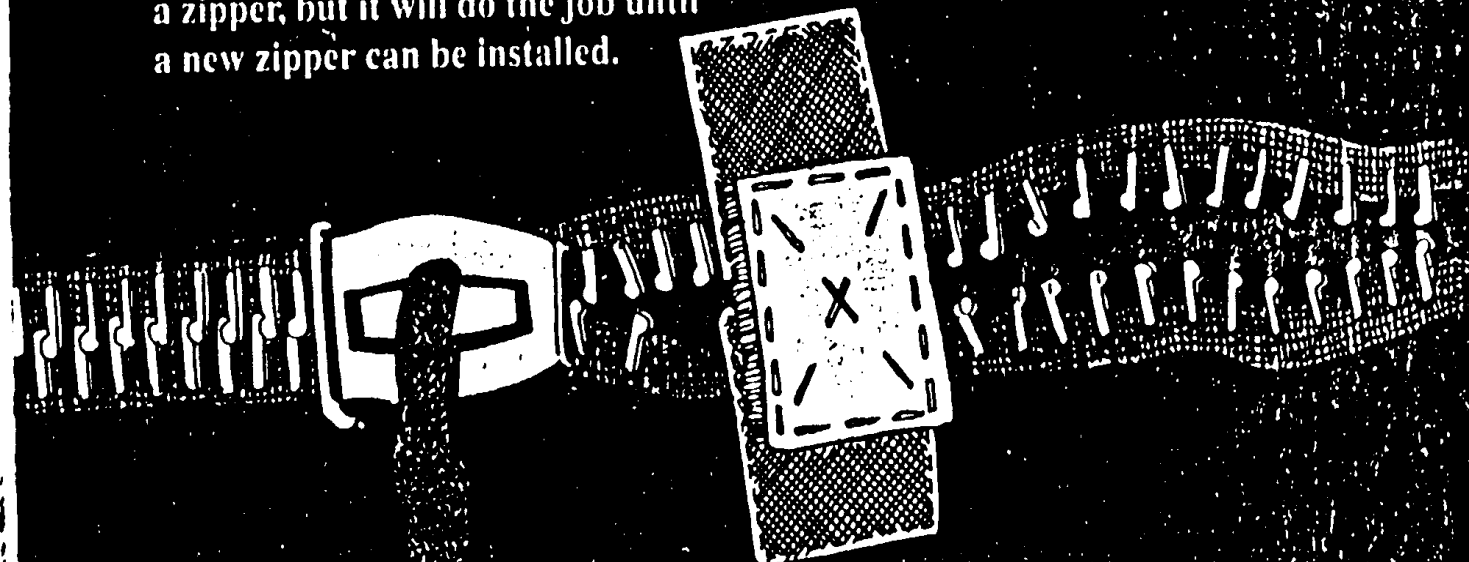
- Wash with soap, water and a clean, soft cloth.
- Rinse with clean water.
- Apply hand cleaner, NSN 8520-00-782-3509 or NSN 8520-00-782-3509 with a clean soft cloth or sponge.
- Wipe the cleaner off immediately with a dry cloth.

Tactical Vehicles . . .

Quick Zipper Fix

When a zipper breaks on your vehicle, close things up — temporarily — with hook and pile tape.

Hook and pile won't give you a waterproof seal, and is not as strong as a zipper, but it will do the job until a new zipper can be installed.



Get the hook
9881. Both are

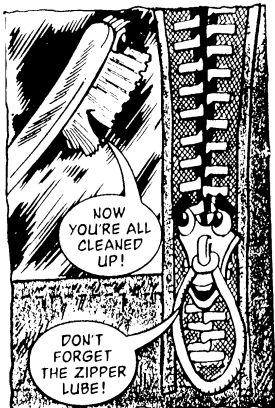
PS 512

with NSN 8315-01-115-7617. Pile is NSN 8315-01-043-
one inch wide, and self-adhesive.

20

JUL 95

PAGE 22-37C



A stuck zipper on a HMMWV's soft top needs cleaning and lube, not muscle. Muscle just ruins the zipper.

Drivers, you've got to remove grit and sand caught in the zipper teeth. Do it with an old toothbrush. Then lube the zipper teeth with zipper lube, NSN 9150-00-999-7548. That NSN brings a box of 24 sticks.

If you've already ruined a zipper, here's a tip to keep your soft top from flapping until it's repaired or replaced:

Use hook and pile tape. It won't be waterproof and it isn't as strong as a zipper, but it works.

Get a yard of 1-in wide, self-adhesive hook with NSN 8315-01--115-7617. Matching pile is: NSN 8315-01-043-9881. Cut and place pieces of tape where they'll do the most good.

Save Those Doors



Before you trash that HMMWV soft-top door because the window is too scratched or discolored to see through, ask your DS canvas repair shop if they can replace the plastic. That's what SSG Clarence Johnson and SPC Alice Pursley of the California ARNG did. They figure they've saved their state more than \$13,000 in replacement costs in six months.

One plastic sheet, NSN 9330-00-988-1894, should fix two soft-top doors for about \$16 plus labor. New doors cost from \$73 to more than \$100.

HMMWV ...

Door Handle Fix

KEEP
YOUR HMMWV'S
HANDLE FROM
COMING OFF IN
YOUR HAND WITH
THIS HANDY
FIX.

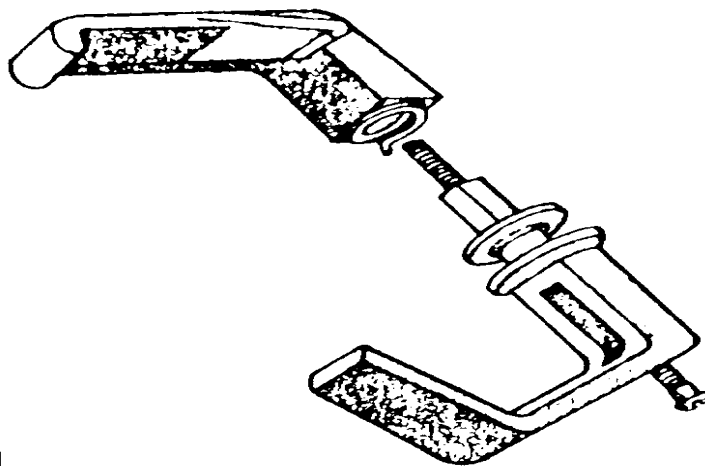


Eyeball Pages 3-11 through 3-18 of TB 43-0001-39-7 (Dec 95) for the fix to end all fixes for door handles on soft-side HMMWVs.

Many of you already use a form of this fix, in which a single screw holds both the outer and inner handles together as a unit.

If you don't have a copy of the TB, contact MSG Half-Mast by fax, DSN 645-0961 (commercial 205-955-0961).

New longer screw



PS 524

Chapter 26

TOOLS AND
TEST
EQUIPMENT

Functional
Group Code
2604

3-11. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Tire Compression Tool Inspection

POC:

Ms. Patricia Grashik, AMSTA-IM-HLA, DSN 786-5225, Commercial
(810)574-5225 grashikp@cc.tacom.army.mil

COMMENTS:

A. Before using the runflat compression tool, NSN 5120-01-335-5847, inspect the tool's pivot points, bearings, and strap for fraying.

CAUTION

Oil on belt or handle could result in personnel injury or damage to equipment. Wipe any oil off belt or handle .

B. Ensure gears and pivot points have a light coat of oil (seasonal grade OE) for ease of operation and protection against rust.

PUBLICATIONS AFFECTED :

TM9-2320-280-20-2

LEVEL OF MAINTENANCE:

Unit

Chapter 32

**BASIC ISSUE
ITEMS (BII)**

**Functional
Group Code
3200**

3-10. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

2 Ton Jack Usage

POC:

Ms. Jody McInerney, AMSTA-MTA, DSN 786-7346, Commercial (313) 574-7346

DEFICIENCY:

We have received reports of the 2 Ton Jack bending when attempting to change a tire on the S-250 Shelter Carrier (M1037).

COMMENTS:

A. The two main causes of failure are due to the jack slipping under possible overload, or jack loaded improperly causing a side overload condition. This jack has been tested and it has been demonstrated that it meets all weight requirements. It is designed to support loads in a raised and lowered position.

B. The jack is intended to be used for tire replacement only. Don't try to lift more than one wheel at a time. Make sure to follow the procedures located in the Operators Manual, TM9-2320-280-10, Wheel Assembly Replacement, paragraph 3-25 for proper placement of the jack under the control arm. Lift only as high as needed to replace the tire. Remember the higher you lift, the greater chance of a side overload/slippage to occur.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

Operator and Unit

Heavier Jack for M1097s

A 3 1/2 ton jack, NSN 5120-01-375-0070, is authorized for M 1097 HMMWVs. Some trucks (serial number 147072 and below), however, came with a 2-ton jack. If your truck doesn't have the heavier jack, get one in a one-time free issue deal by sending a memo to:

US Army TACOM

You can also use e-mail:

ATTN: SFAE-TWV-LTV (Ron Mara)

marar@cc.tacom.army.mil

Warren, MI 48397-5000

Include the vehicle serial number and your complete address, DODAAC and POC with phone number

Chapter 33

SPECIAL PURPOSE KITS

**Functional
Group Code
3303-3307**

3-16. Tactical Trucks

MODEL:

M998 series vehicles equipped with 5705698 Arctic Heater Kit

SUBJECT:

Modification of Arctic Heater Kit and Front Radio Rack Installation

POC:

Ms. Jody McInerney, AMSTA-MTA, DSN 786-7346, Commercial (810) 574-7346, mcinerilj@cc.tacom.army.mil

DEFICIENCY:

Reports from the field indicate that in arctic conditions from 0° F to -50° F the arctic heater does not provide an even flow of heat. Also, the current design of front radio rack mount is causing cracks in the tunnel floor and upper bracket nut failures.

COMMENTS:

A procedure has been developed to modify the arctic heater kit to direct a sufficient amount of heat through the vehicle during arctic operations. Also, a new brace and bracket design has been developed which will prevent tunnel floor cracks and eliminate upper bracket nut failures. The new arctic heater kit can only be installed in conjunction with the front radio rack improvement. Improvements and installation can be accomplished in the field using the following materials, parts, and procedures.

MATERIALS/PARTS:

<u>NSN/(CAGEC) P/N</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
(5DO28) RTV 736	Sealant	A/R
5310-00-013-1245	Nut	4
5310-01-102-3270	Washer	2
5310-01-186-8641	Nut	2
5305-00-543-4372	Screw	2
5310-00-935-9021	Nut	2
5975-01-034-5871	Strap, Tie-down	3
5320-01-134-8671	Rivet	2
5310-00-044-6212	Washer	2
5310-00-814-0673	Nut	2
5310-01-171-8120	Washer	2

3-16. Tact. Trucks cont.

NSN/(CAGEC) P/N	NOMENCLATURE	QTY
5320-01-023-2529	Rivet	2
5320-01-143-5075	Rivet	2
(19207)12446763	Rack Bracket, Upper Radio	2
(19207)12446764	Brace, Radio Rack	1
(19207)12446765	Bracket Assembly, Radio Mounting	2
(19207)12446766	Bracket, Radio Rack Mounting	2
(19207)12447054	Duct, Flexible	1

PROCEDURE:**A. VEHICLE PREPARATION.**

1. Remove front radio rack. (Refer to TM9-2320-280-20.)
2. Remove front floorboard. (Refer to TM9-2320-280-20.)
3. Remove front radio rack mounting bracket. (Refer to TM9-2320-280-20.)
4. Remove engine access cover. (Refer to TM9-2320-280-20.)
5. Remove instrument cluster. (Refer to TM9-230-280-20.)
6. Repair any cracks in tunnel floor. (Refer to TM9-2320-280-34.)
7. Remove seven rivets (7) from top retainer (8) and diverter box (9). (see figure 3-69)
8. Remove top retainer (8) and cover (12) from plenum panel (1).
9. Remove nine screws (1), engine shroud mount (10), and plenum panel (1) from "A" beam (2).
10. Remove four screws (3), washers (5), nuts (6), and two mounting brackets (4) from "A" beam (2).
11. Remove two rivets (2), heater duct Insert (3), and heater duct bracket (4) from "A" beam (5). (see figure 3-70)
12. Remove clamp (1) from heater duct bracket (4) and remove heater duct insert (3) and heater duct bracket (4) from heater duct (6).
13. Remove two clamps (8), three tie-down straps (10), and heater duct (6) from dimmer switch bracket (7) and dimmer switch wire harness (9).
14. Remove two rivets (2) from tunnel floor (1) and remove radio rack brace (3). (see figure 3-7 1)

B. INSTALLATION OF RADIO RACK MOUNTING BRACKETS.

1. Locate, mark, and drill two 0.440-inch diameter holes (1) in plenum panel (2). (see figure 3-72)

3-16. Tact. Trucks cont.

2. Locate, mark, and drill four 0.281-inch diameter holes (2) in "A" beam (1). (see figure 3-73)
3. Cut two 0.75-inch square holes (5) in floor mat (4) on top of tunnel floor (7).
4. Using two P/N 12446766 radio rack mounting brackets (8) as templates, locate, mark, and drill two 0.313-inch diameter holes (6) in top of tunnel floor (7).
5. Secure P/N 12446764 radio rack brace (12) and two radio rack mounting brackets (1) to tunnel floor (13) with four existing screws (9) and washers (10). (see figure 3-74)
6. Locate two holes (1) in tunnel floor (13) made by rivets removed in para. A, step 14, and drill two 0.192-inch diameter holes in radio rack brace (12).
7. Install two NSN 5320-01-143-5075 rivets (14) in tunnel floor (13) and radio rack brace (12).
8. Position two P/N 12446765 radio mounting bracket assemblies (3) to "A" beam (6) and secure with four existing screws (2), washers (4), and NSN 5310-00-013-1245 nuts (5).

C. INSTALLATION OF FLEXIBLE DUCT.

1. Route P/N 12447054 flexible duct (2) from diverter box (3) along 'A' beam (5), through dash (1), down to and through dimmer switch bracket (7). (see figure 3-75)
2. Install flexible duct (2) in diverter box (3).
3. Locate, mark, and drill two 0.129-inch diameter holes in diverter box (3) and flexible duct (2).
4. Remove flexible duct (2) and apply RTV 736 sealant around the area of the flexible duct (2) that is to be installed in diverter box (3). Then install flexible duct (2) in diverter box (3).
5. Install two NSN 5320-01-134-8671 rivets (4) in diverter box (3) and flexible duct (2).
6. Secure flexible duct (2) to steering column mount (10) and dimmer switch bracket (7) with two clamps (8).
7. Secure flexible duct (2) to dimmer switch wire harness (6) with three NSN 5975-01-034-5871 tiedown straps (9).
8. Apply RTV 736 sealant to fill two holes (3) in plenum panel (2). (see figure 3-72)
9. Apply RTV 736 sealant to fill four holes (3) in "A" beam (1) and two holes (9) in floor mat (4). (see figure 3-73)
10. Position plenum panel (1) and engine shroud mount (8) on "A" beam (6) and secure with nine existing screws (7). (see figure 3-74)
11. Install two NSN 5320-01-023-2529 rivets (7) and NSN 5310-01-171-8120 washers (8) in diverter box (9). (see figure 3-76)
12. Install two P/N 12446763 tipper radio rack brackets (5) on plenum panel (6) and secure with two NSN 5305-00-543-4372 screws (3) and NSN 5310-00-044-6212 washers (4).

3-16. Tact. Trucks cont.

13. Install front floor board. (Refer to TM9-2320-280-20.)
14. Install engine access cover. (Refer to TM9-2320-280-20.)
15. Install instrument cluster. (Refer to TM9-2320-280-20.)
16. Position front radio rack (17) on two radio rack mounting brackets (1 4) and secure with two existing screws (13), washers (15), and NSN 5310-00-935-9021 nuts (16). (see figure 3-76)
17. Position front radio rack (17) to tipper radio rack brackets (5) and secure with two NSN 5310-01-102-3270 washers (2) and NSN 5310-01-186-8641 nuts (1).
18. Install two "P" clamps (10) on front radio rack (17) and secure with two existing screws (11) and NSN 5310-00-814-0673 nuts (12).
19. Spot paint as necessary. (Refer to TM 43-0139.)

PUBLICATIONS AFFECTED:

TM9-2320-280-20

TM9-2320-280-20P

TM9-2320-280-34P

LEVEL OF MAINTENANCE:

Direct Support

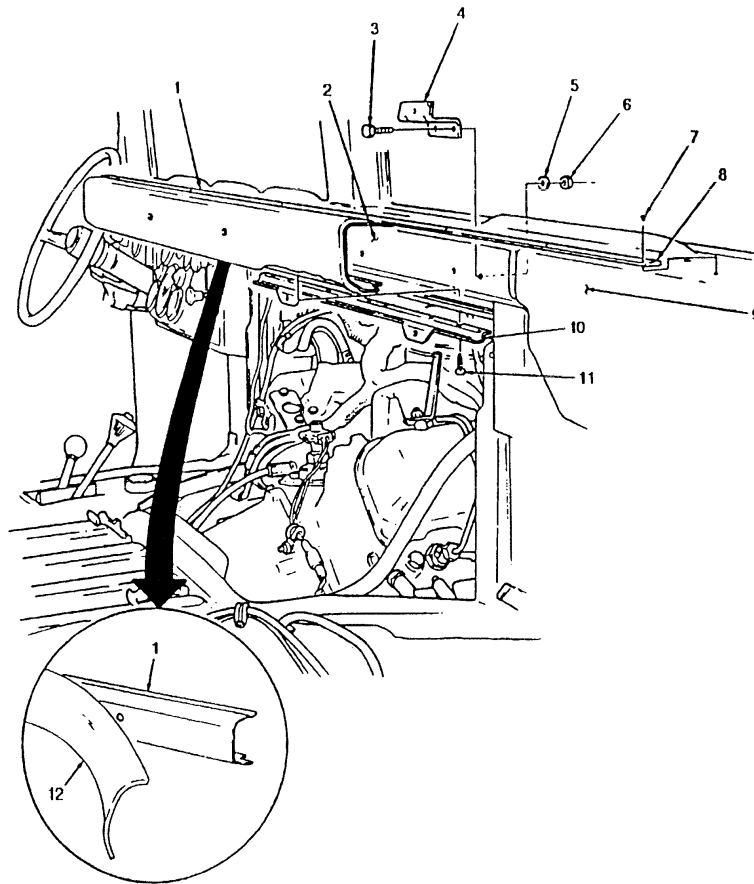


FIGURE 3-69

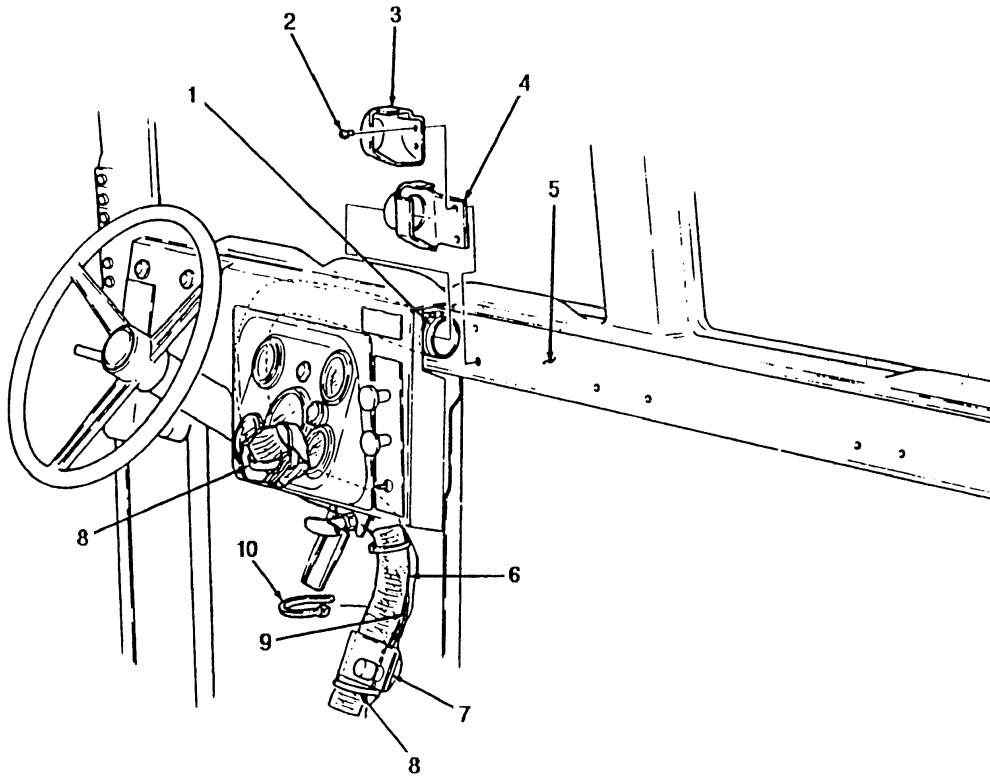


FIGURE 3-70

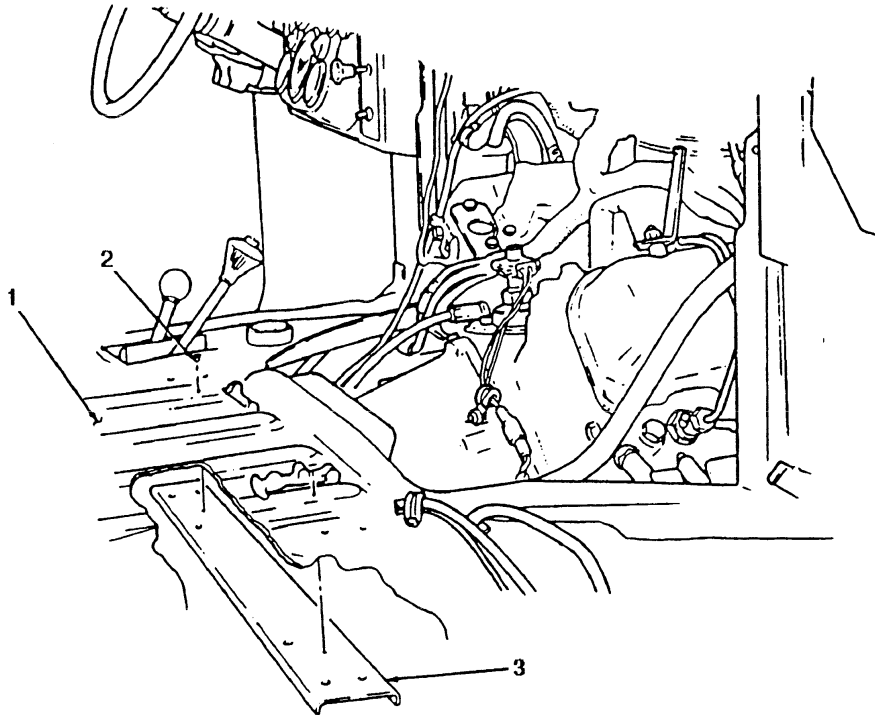


FIGURE 3-71



NOTE:
ALL DIMENSIONS ARE
IN INCHES

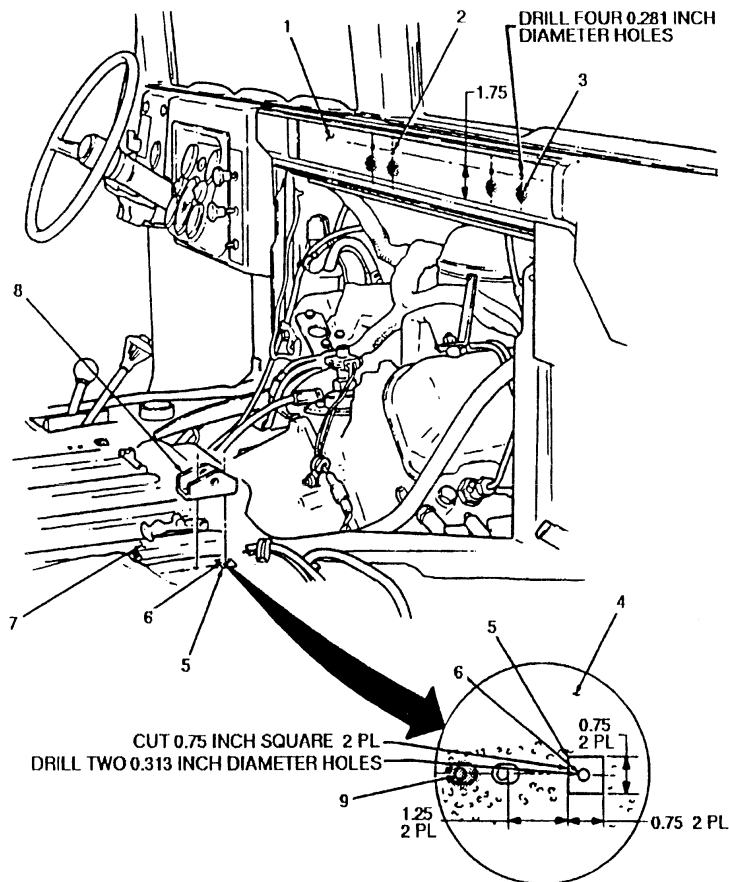


FIGURE 3-73

NOTE:
ALL DIMENSIONS ARE IN INCHES

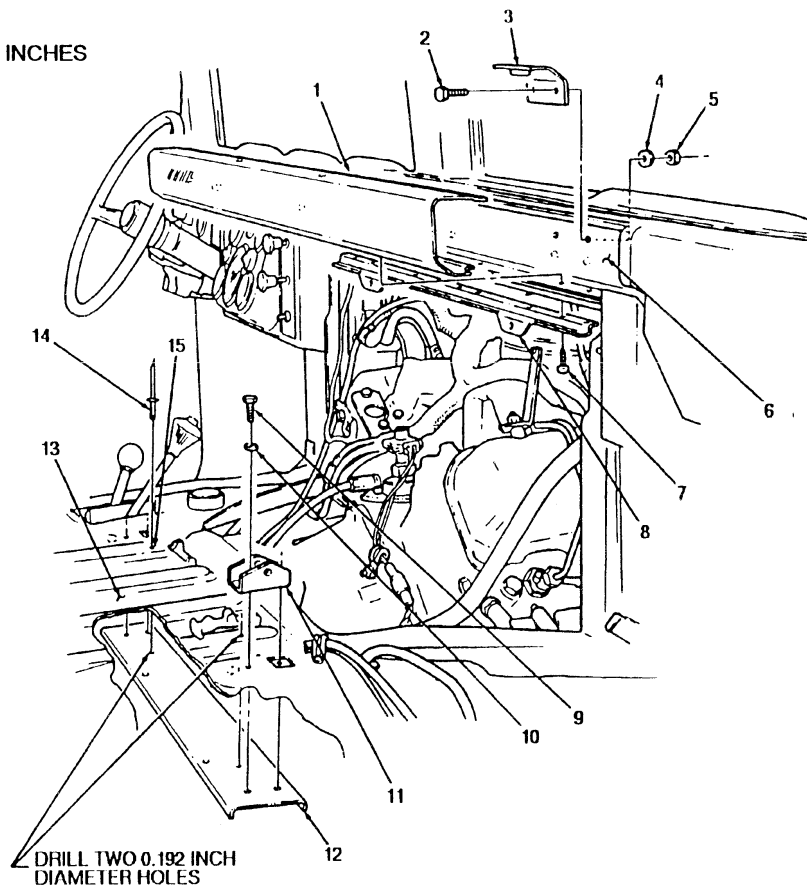


FIGURE 3-74

NOTE: ALL DIMENSIONS ARE IN INCHES

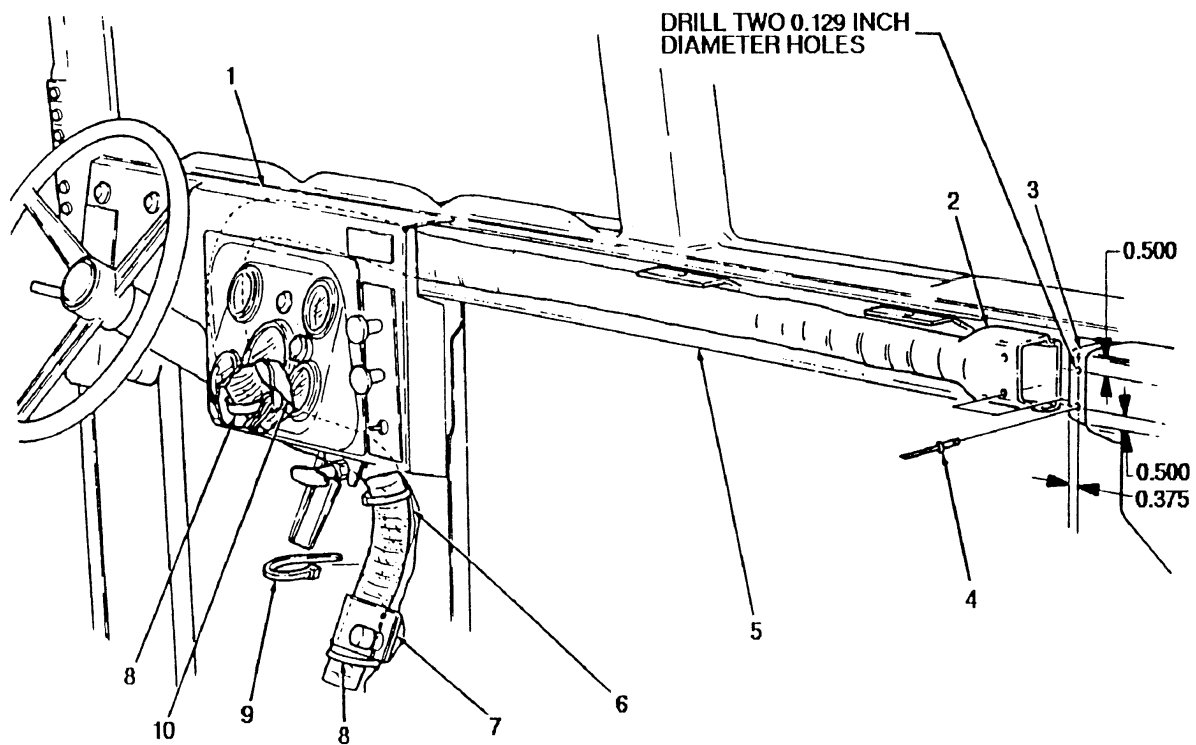


FIGURE 3-75

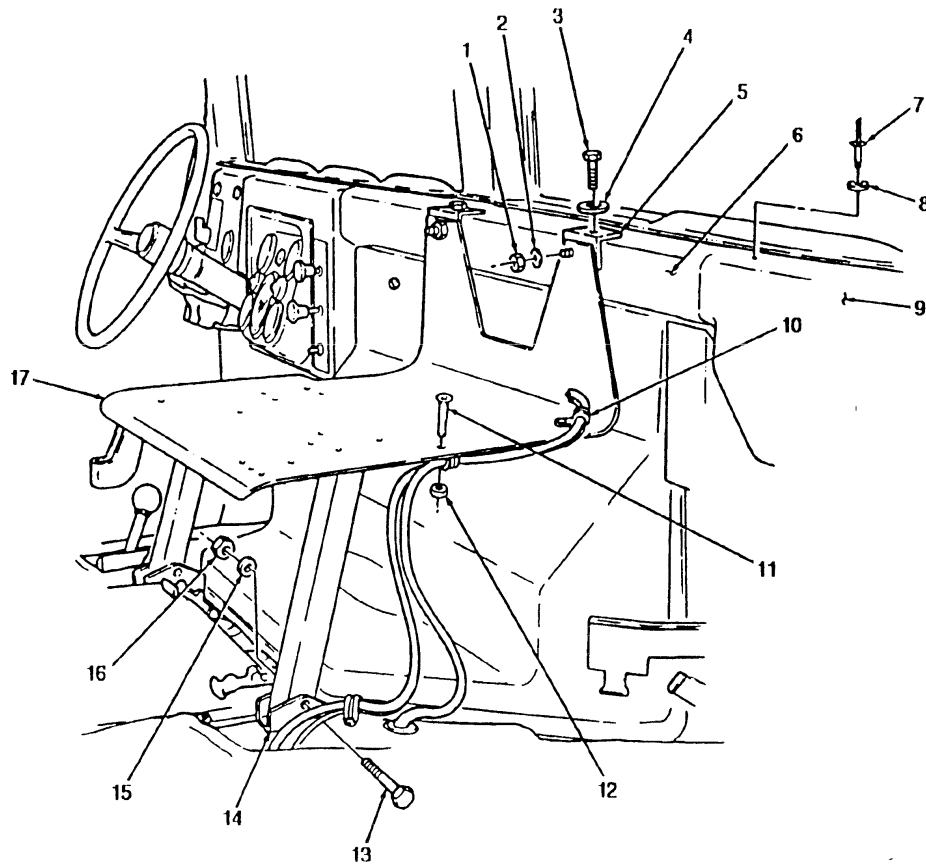


FIGURE 3-76

3-15. Tactical Trucks

MODEL:

All M998 Series Vehicles except those with 5705698 Arctic Heater Kit Installed

SUBJECT:

Improved Front Radio Rack Mounting Installation

POC:

Ms. Jody McInerney, AMSTA-MTA, DSN 786-7346,
Commercial (810) 574-7346, mcinernj@cc.tacom.army.mil

DEFICIENCY:

Current design of front radio rack mount is causing tunnel floor cracks and upper bracket nut failures.

COMMENTS:

A new radio rack mount has been developed which will prevent tunnel floor cracks and eliminate upper bracket nut failures. The current radio rack mount can be improved by using the following materials, parts, and procedures.

MATERIALS/PARTS:

NSN/(CAGEC) P/N	NOMENCLATURE	QTY
5310-00-013-1245	Nut	4
5310-01-102-3270	Washer	2
5310-01-186-8641	Nut	2
5305-00-543-4372	Screw	2
5310-00-044-6212	Washer	2
5310-00-814-0673	Nut	2
5310-00-935-9021	Nut	2
5320-01-143-5075	Rivet	2
6850-01-159-4844	RTV Sealant	A/R
(19207)12446763	Rack Bracket, Upper Radio	2
(19207)12446764	Brace, Radio Rack	1
(19207)12446765	Bracket Assembly, Radio Mounting	2
(19207)12446766	Bracket, Radio Rack Mounting	2

3-15. Tact. Trucks cont.

PROCEDURE:

A. VEHICLE PREPARATION.

1. Remove front radio rack. (Refer to TM9-2320-280-20.)
2. Remove front floorboard. (Refer to TM9-2320-280-20.)
3. Remove front radio rack mounting bracket. (Refer to TM9-2320-280-20.)
4. Remove engine access cover-. (Refer to TM9-2320-280-20.)
5. Remove nine screws (8) and plenum panel (1) from "A" beam (2) and engine shroud mount (7). (see figure 3-63)
6. Remove four- nuts (6), washers (5), screws (3), and two mounting brackets (4) from "A" beam (2).
7. Remove two rivets (2) from tunnel floor (1) and remove radio rack brace (3). (see figure 3-64)
8. If damaged, repair tunnel floor around radio rack mounting area. (Refer to TM9-2320-280-34.)

B. FRONT RADIO RACK INSTALLATION.

1. Locate, mark, and drill two 0.440-inch diameter holes In plenum panel (1). (see figure 3-65)
2. Locate, mark, and drill four 0.281-inch diameter holes In "A" beam (1). (see figure 3-66)
3. Cut two 0.75-inch square holes in floor mat (5) on top of tunnel floor (6).
4. Using two P/N 12446766 radio rack mounting brackets (3) as templates, locate, mark, and drill two 0.313-inch diameter holes in top of tunnel floor (6).
5. Apply NSN 6850-01-159-4844 RTV sealant to two holes (2) in plenum panel (1). (see figure 3-65)
6. Apply NSN 6850-01-159-4844 RTV sealant to four holes (2) In "A" beam (1) and two holes (4) in top of tunnel floor (6). (see figure 3-66)
7. Position P/N 12446764 radio rack brace (13) and two radio rack Mounting brackets (12) to tunnel floor (14) and secure with four existing washers (15) and screws (16). (see figure 3-67)
8. Position two P/N 12446765 radio mounting bracket assemblies (7) to "A" beam (5) and secure with four existing screws (6), washers (8), and NSN 5310-00-013-1245 nuts (9).
9. Position plenum panel (1) oil "A" beam (5) and engine shroud mount (1) and secure with nine existing screws (10).
10. Position two P/N 12446763 upper radio rack brackets (2) on plenum panel (1) and secure with two NSN 5305-00-543-4372 screws (3) and NSN 5310-00-044-6212 washers (4).
11. Locate two holes (6) in tunnel floor (1) left by rivets (2) removed in para. A, step 7, and drill two 0.192-inch diameter holes (4) in radio rack brace (3). (see figure 3-64)

3-15. Tact. Trucks cont.

12. Install two NSN 5320-01-143-5075 rivets (5) in tunnel floor (1) and radio rack brace (3). (see figure 3-64)
13. Install front floorboard. (Refer to TM9-2320-280-20.)
14. Install engine access cover. (Refer to TM9-2320-280-20.)
15. Position front radio rack (1) on tunnel floor (12) and secure to two radio rack mounting brackets (1) with two existing screws (10), washers (13), and NSN 5310-00-935-9021 nuts (14). (see figure 3-68)
16. Position front radio rack (1) to plenum panel (4) and secure to upper radio rack brackets (5) with two NSN 5310-01-102-3270 washers (3) and NSN 5310-01-186-8641 nuts (2).
17. Position radio cables (9) on front radio rack (1) and secure with two existing clamps (7), screws (6), and NSN 5310-00-814-0673 nuts (8).
18. Spot paint as necessary. (Refer to TM 43-0139.)

PUBLICATIONS AFFECTED:

TM9-2320-280-20
TM9-2320-280-20P
TM9-2320-280-34P

LEVEL OF MAINTENANCE:

Direct Support

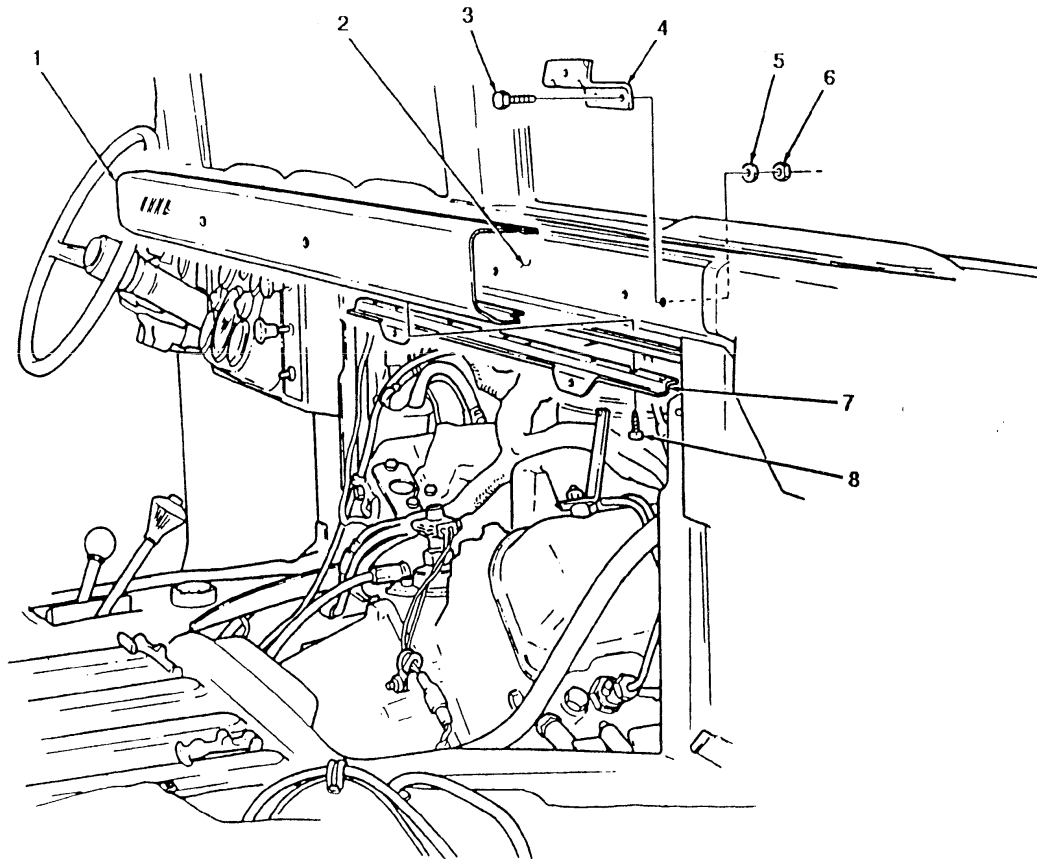


FIGURE 3-63

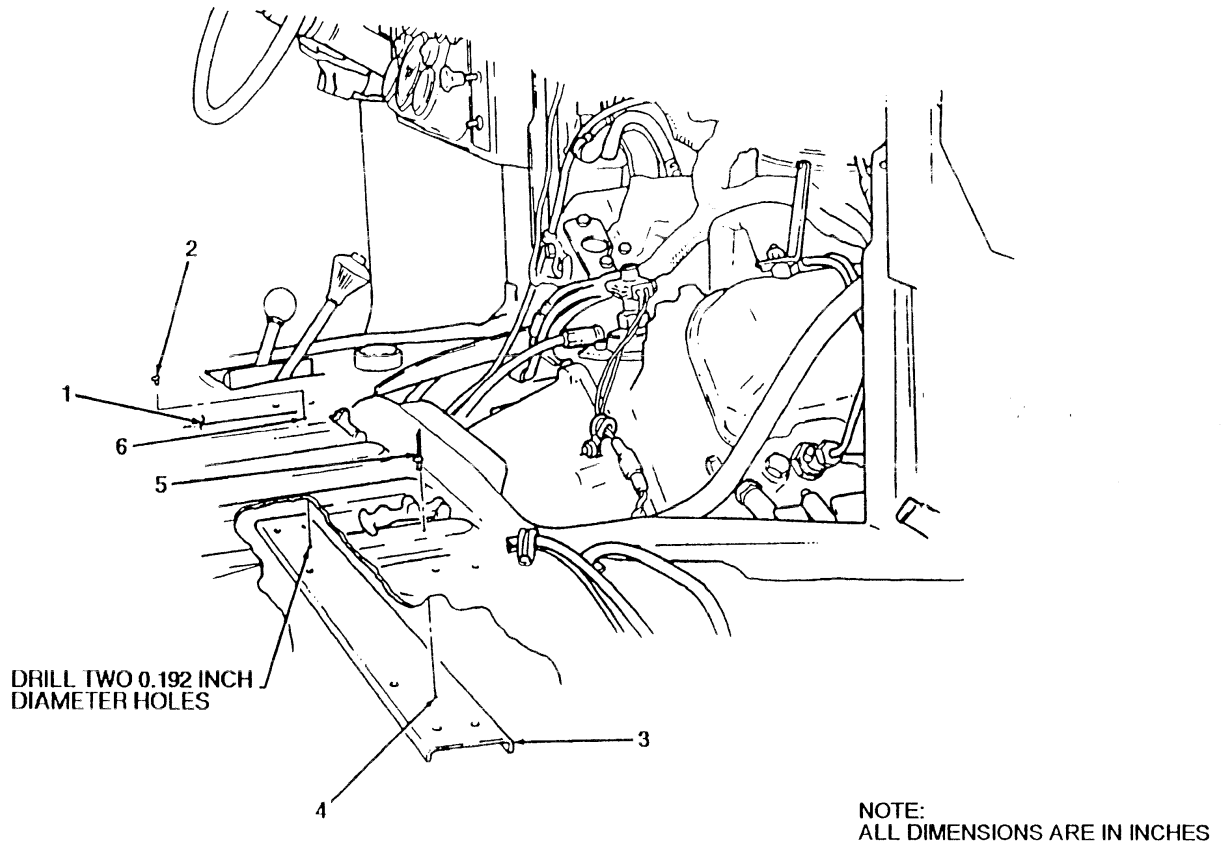


FIGURE 3-64

NOTE:
ALL DIMENSIONS ARE IN INCHES

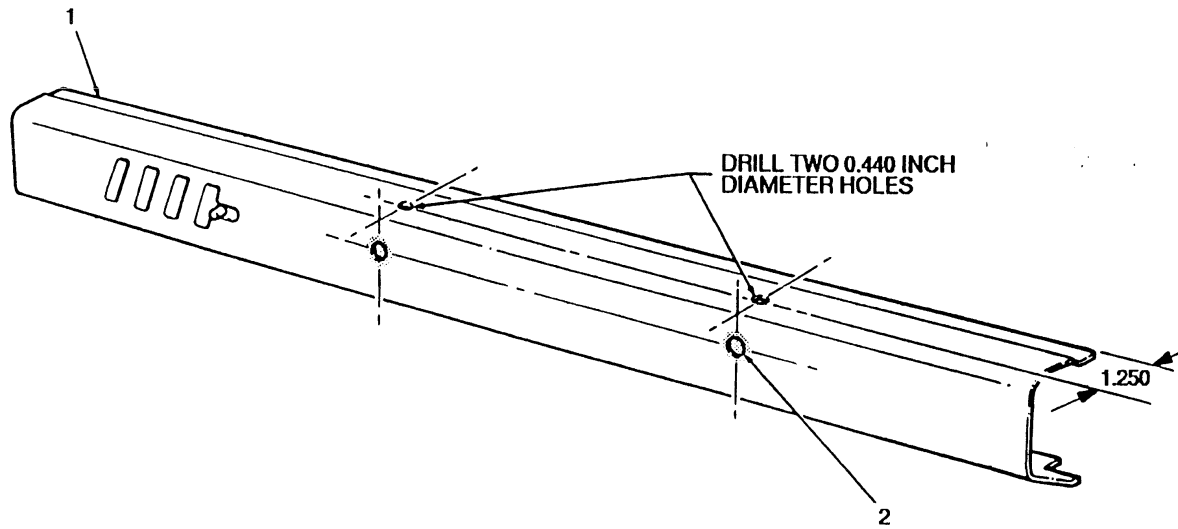


FIGURE 3-65

NOTE:
ALL DIMENSIONS ARE IN INCHES

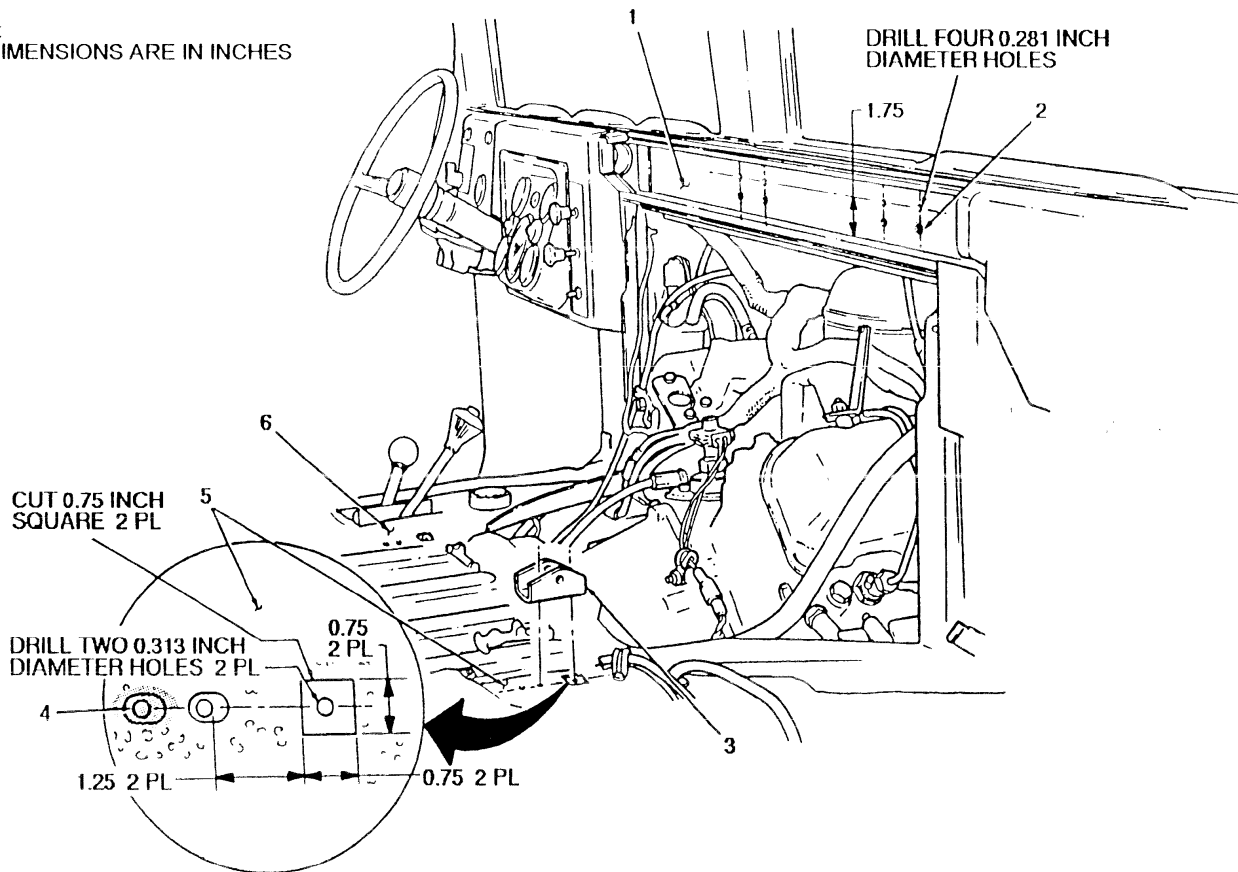


FIGURE 3-66

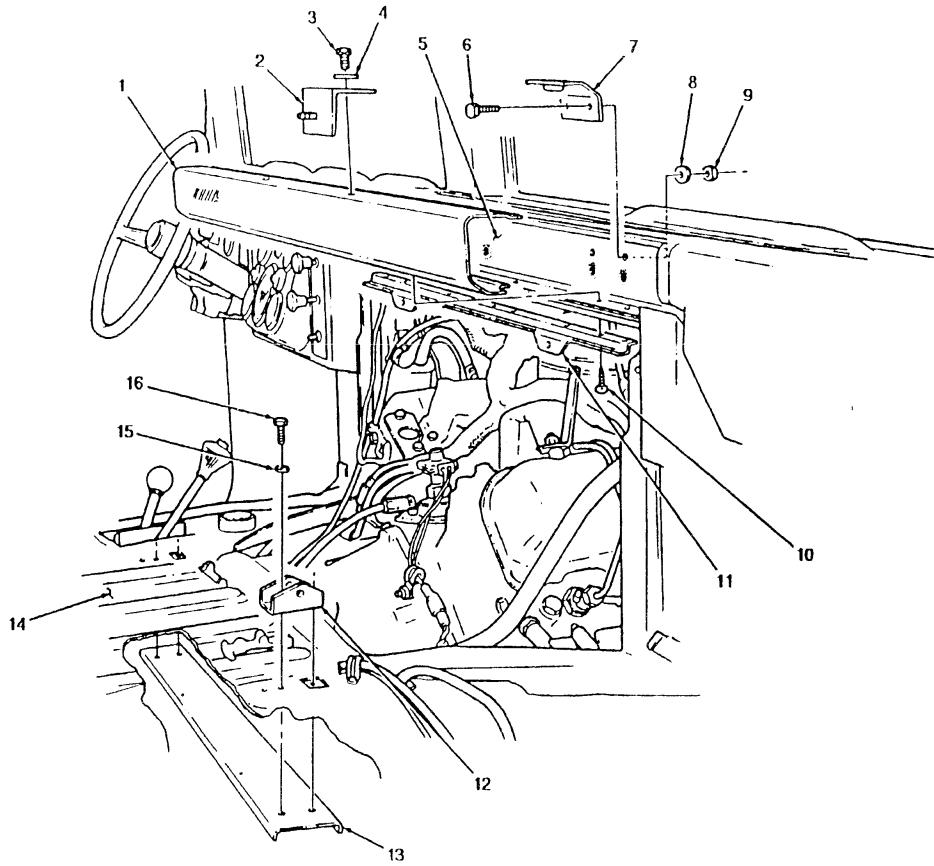


FIGURE 3-67

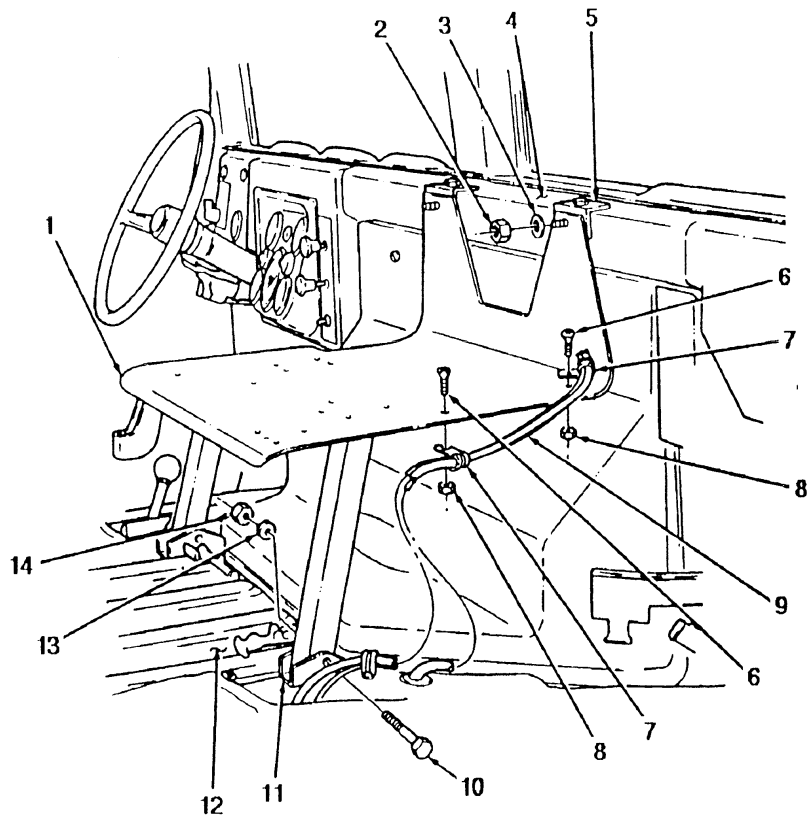


FIGURE 3-68

3-11. Tactical Trucks

MODEL:

HMMWV, with Troop/Cargo Area, Two-Door Winterization Kit 5705611 installed

SUBJECT:

Modification of diverter assembly and installation of air ventilator and light diverter

POC:

Ms. Patricia Grashik or Mr. Keith Barthlow, AMSTA-MTA,
DSN 786-7427/8288, Commercial (313) 574-7427/8288

DEFICIENCY:

Reports from the field indicate that NSN 2805-01-317-2725 diverter assembly can starve heater of air.

COMMENTS:

Procedures have been developed to modify NSN 2805-01-317-2725 diverter assembly to eliminate the possibility of the heater being starved of air. Fabrication of light diverter and installation of NSN 2540-01-164-1886 ventilator to ventilate the cargo area enclosure will eliminate insufficient air problems. These corrective actions can be accomplished in the field by using the following parts and materials.

3-11. Tact. Trucks cont.

MATERIALS/PARTS:

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QUANTITY</u>
2540-01-164-1886	Ventilator	1
5305-01-315-9882	Screw	8
5320-01-271-6357	Rivet	3
6850-01-159-4844	Sealant RTV	AR
9515-00-640-4201	Steel Sheet	1

Part to be fabricated from material requisitioned:

<u>NOMENCLATURE</u>	<u>QUANTITY</u>
Light Diverter	1

PROCEDURE:

A. Fabrication.

Using NSN 9515-00-640-4201 steel sheet, fabricate light diverter. (see figures 3-30 and 3-31)

B. Installation Procedures.

- (1) Loosen two clamps (2) and remove diverter assembly (3) from adapter (4) and flex duct (1). (see figure 3-32)
- (2) Locate, mark, and drill three 0.193" diameter holes through diverter assembly (1) and damper (2). (see figure 3-33)
- (3) Secure damper (2) to diverter assembly (1) using three NSN 5320-01-271-6357 rivets (3).
- (4) Cut handle assembly (4) from diverter assembly (1).
- (5) Install diverter assembly (3) on adapter (4) and flex duct (1) with two clamps (2). (see Figure 3-32)
- (6) Using NSN 2540-01-164-1886 ventilator (2) as a template, locate, mark, and drill four 0.109" diameter holes 0.750" deep in right rear enclosure (1). (see figure 3-34)
- (7) Locate and mark area (5) to be cut out in right rear enclosure (1).

3-11. Tact. Trucks cont.

- (8) Cut out area (5) in right rear enclosure (1).
- (9) Apply a bead of NSN 6850-01-159-4844 RTV sealant (4) on ventilator (2).
- (10) Secure ventilator (2) to right rear enclosure (1) using four NSN 5305-01-315-9882 screws (3).
- (11) Using light diverter (2) as a template, locate, mark, and drill four 0.109" diameter holes 0.750" deep in right rear enclosure (1). (see figure 3-35)
- (12) Apply beads of RTV sealant (4) on light diverter (2).
- (13) Secure light diverter (2) on right rear enclosure (1) using four screws (3).
- (14) Apply a bead of RTV sealant (5) between ventilator (6) and light diverter (2).
- (15) Spot paint as necessary. (Refer to TM43-0139).

PUBLICATIONS AFFECTED:

TM9-2320-280-34 TM9-2320-280-34P

LEVEL OF MAINTENANCE:

Direct Support

NOTE:

- (1) ALL DIMENSIONS ARE IN INCHES.
- (2) MATERIAL:
 - A. STEEL, CARBON, SHEET OR STRIP,
HR, CQ, P&O,
IAW ASTM A569
.0630 THICK
 - B. ALTERNATE MATERIAL:
STEEL, CARBON, SHEET,
CR, CQ
IAW ASTM A366
.0630 THICK
- (3) REMOVE ALL BURRS AND SHARP EDGES.
- (4) DIMENSIONAL LIMITS APPLY WITHOUT PAINT.

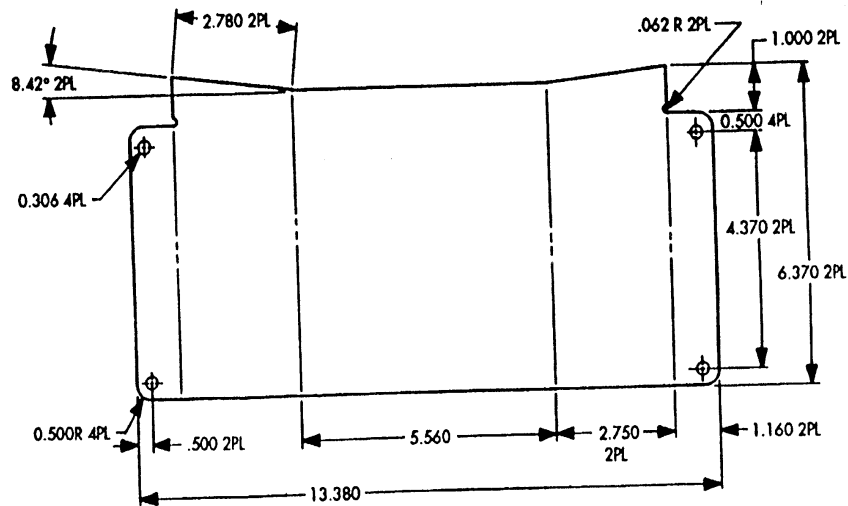


FIGURE 3-30

NOTE:

- (1) ALL DIMENSIONS ARE IN INCHES.
- (2) MATERIAL:
 - A. STEEL, CARBON, SHEET OR STRIP,
HR, CQ, P&O,
IAW ASTM A569
.0630 THICK
 - B. ALTERNATE MATERIAL:
STEEL, CARBON, SHEET,
CR, CQ
IAW ASTM A366
.0630 THICK
- (3) REMOVE ALL BURRS AND SHARP EDGES.
- (4) ALL WELDS SHALL BE IAW MIL-STD
CLASS 1, MIL-STD-1261.
- (5) ALL WELD SIZES ARE MINIMUM.
- (6) DIMENSIONAL LIMITS APPLY WITHOUT PAINT.
- (7) PAINT IAW TM 43-0139 GREEN 383

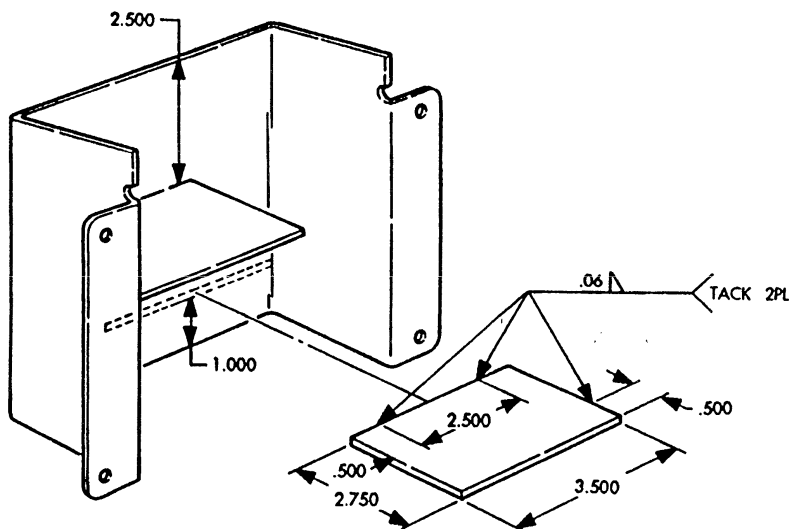


FIGURE 3-31

33-26

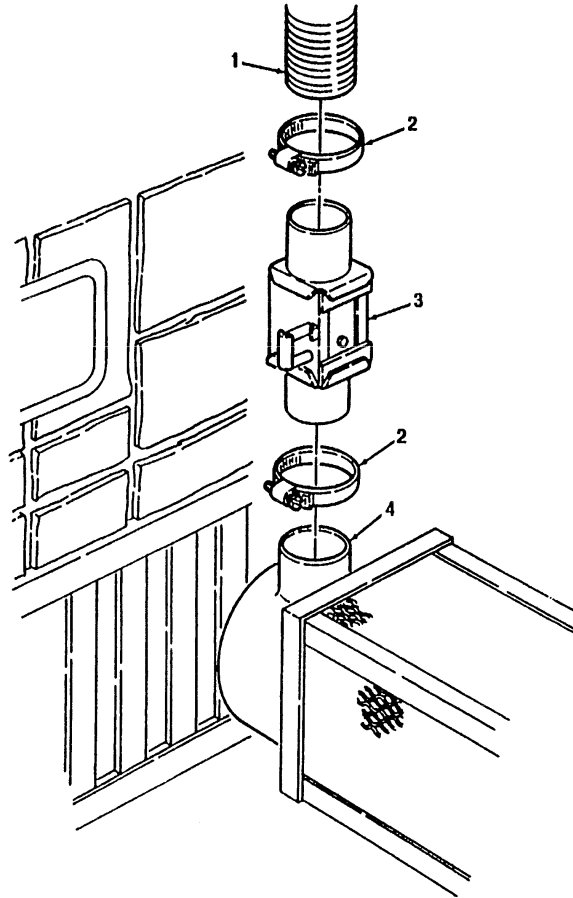


FIGURE 3-32

NOTE: ALL DIMENSIONS ARE IN INCHES.

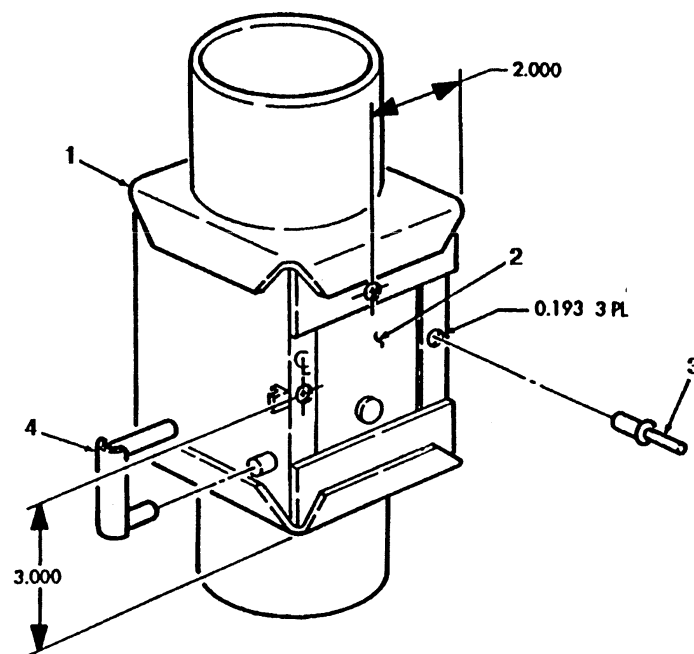


FIGURE 3-33

NOTE: ALL DIMENSIONS ARE IN INCHES.

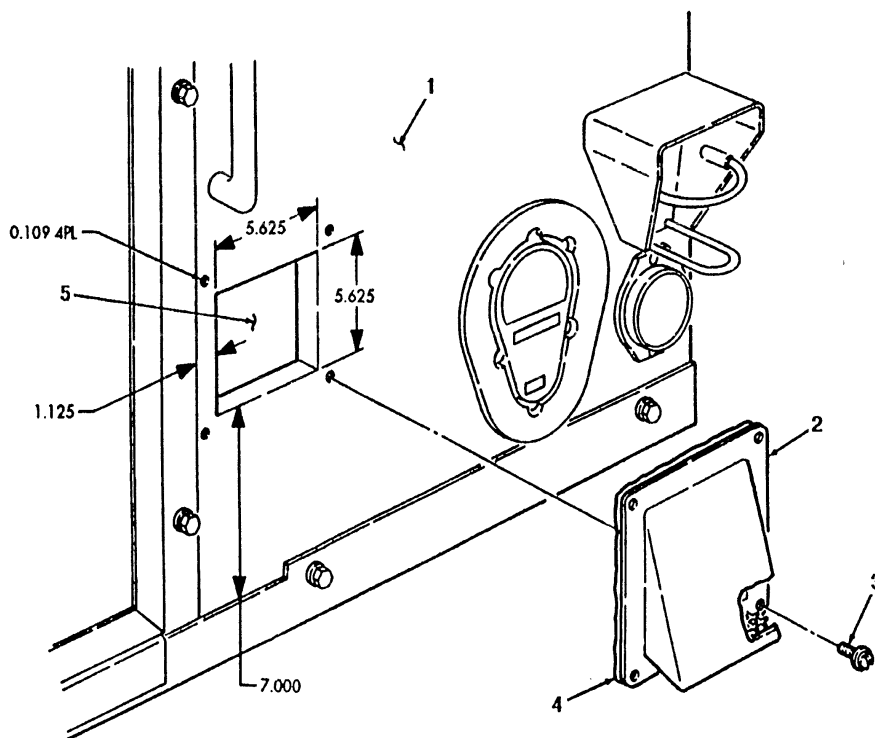


FIGURE 3-34

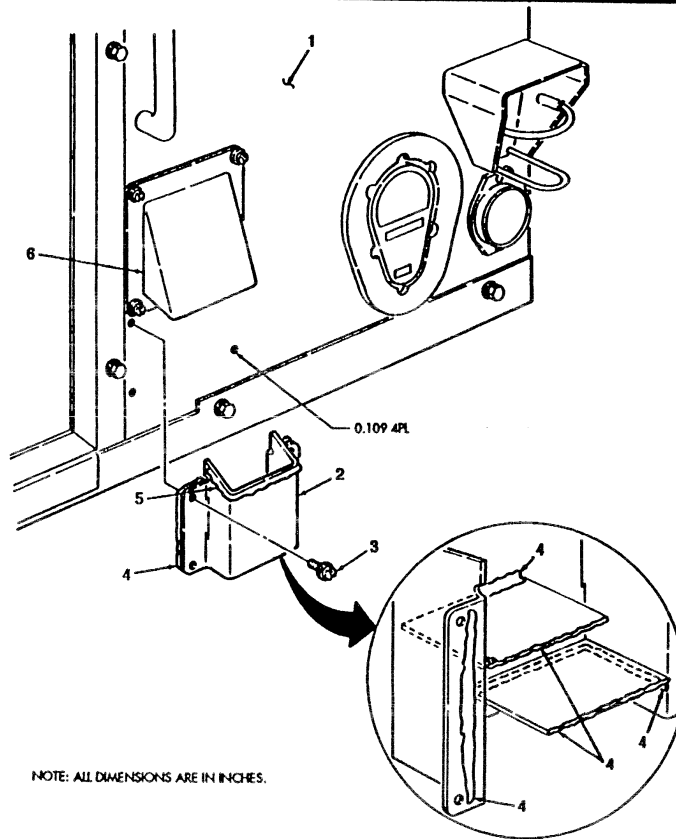


FIGURE 3-35

4-8. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Commercial Brushguards

POC:

Ms. Kathy Catenaro, AMSTA-IM-HLA, DSN 786-5481,
Commercial (810) 574-5481, catenark@cc.tacom.army.mil

COMMENTS:

Before a standardized brushguard was developed for the HMMWV, various commercial brushguards were installed by the field. TACOM does not support the repair of those brushguards. So, if you need parts, you'll have to contact the company directly. If you have a Luverne brushguard, you can contact them @ 1-800-533-0506 to get your repair parts.

PUBLICATIONS AFFECTED:

None

LEVEL OF MAINTENANCE:

N/A

3-7. Tactical Trucks

MODEL:

M998 Series Vehicles, 1-1/4 Ton, 4x4

SUBJECT:

Niehoff 100 AMP Alternator Assembly Diagnostic Procedures

POC:

Ms. Jody McInerney, AMSTA-IM-MTA, DSN 786-7346,
Commercial (810) 574-7346, mcinernj@cc.tacoin.army-mil

DEFICIENCY:

Units lack diagnostic procedures for troubleshooting the Niehoff 100 AMP alternator (NSN 2920-00-000-0183).

COMMENTS:

This procedure provides the diagnostics for troubleshooting the Niehoff 100 AMP alternator assembly when installed in the vehicle. This can be accomplished in the field by using the following instructions. This information will be incorporated into the next manual change of TM9-2320-280-20.

PROCEDURES:

Section I: Alternator Troubleshooting Procedures

For alternator operation, power-on checks, and electrical system wiring diagrams, refer to TM9-2320-280-20.

Section II: Diagnostic Procedures

A. ON-VEHICLE TESTING.

The alternator is examined most easily on the vehicle, where the charging and ignition systems of the vehicle can be examined at the same time.

B. PRELIMINARY CHECKS.

1. Check belt tension. (Refer to TM9-2320-280-20.)
2. Check batteries. (Refer to TM9-2320-280-20.)
3. Check electrical connections in the charging circuits. (Refer to TM9-2320-280-20.)
4. Check ignition circuit. (Refer to TM9-2320-280-20.)

3-7. Tact. Trucks cont.

C. TEST SETUP.

1. Turn fuel off. (Refer to TM9-2320-280-20.)
2. Turn all lights and accessory switches to the "ON" position. (Refer to TM9-2320-280-10.)
3. Crank engine for 10-15 seconds to discharge the battery, then stop cranking.
4. Turn all lights and accessory switches to the "OFF" position. (Refer to TM9-2320-280-10.)
5. Turn fuel on. (Refer to TM9-2320-280-20.)

D. TEST PROCEDURE.

NOTE

All page and paragraphs referenced within steps F1 through F5 refer to TM9-2320-280-20.

Complete diagnostic flowchart steps F1 through F5, as required. (see the following pages 3-11 through 3-14)

PUBLICATIONS AFFECTED:

TM9-2320-280-20

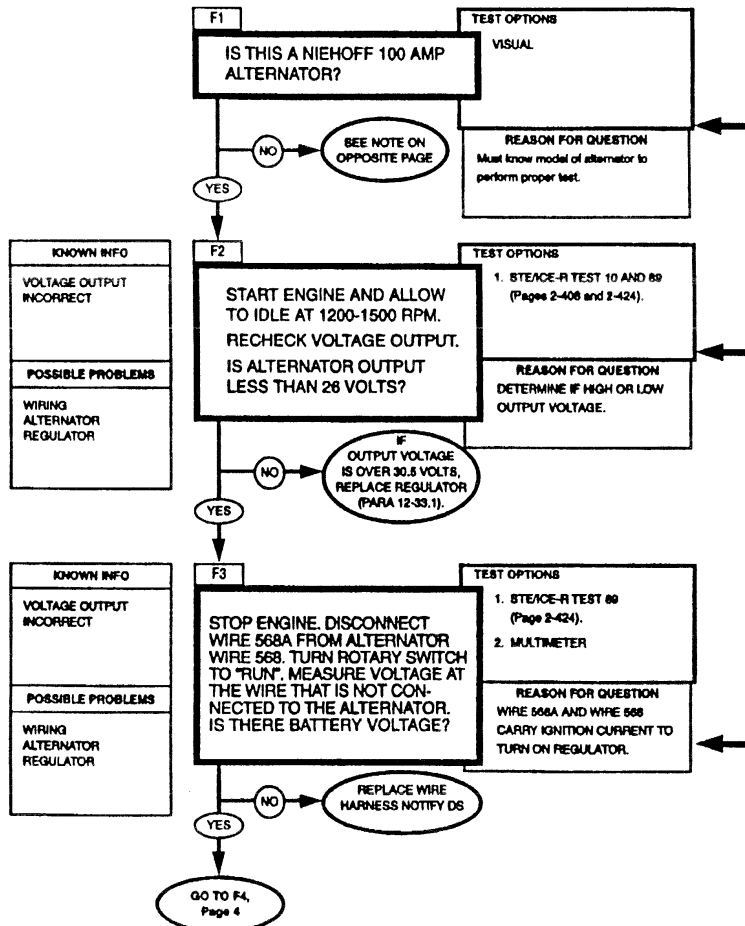
TM9-2320-280-34

LEVEL OF MAINTENANCE:

Unit and Direct Support

ALTERNATOR

DIAGNOSTIC FLOWCHART



REFERENCE INFORMATION

ALTERNATOR

NOTE

FOR 60 AMP PRESTOLITE ALTERNATOR, GO TO B, PAGE 2-188.
FOR 100 AMP PRESTOLITE ALTERNATOR, GO TO C, PAGE 2-192.
FOR 200 AMP PRESTOLITE ALTERNATOR, GO TO D, PAGE 2-192.4.
FOR 200 AMP NIEHOFF ALTERNATOR, GO TO E, PAGE 2-192.10.
FOR 100 AMP NIEHOFF ALTERNATOR, CONTINUE WITH F.

NOTE

The regulator for this model alternator has over voltage protection. Any output voltage over 30.5 volts is an over voltage.
Output voltage of 29-30.5 is acceptable for this alternator.

ENGINE RPM
STEACE-R TEST 10

1. Start test 10, Engine RPM.
2. Crank or start the engine. Display reading is RPM. Engine RPM should be 1200-1500.

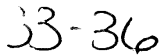
0-45 DC VOLTS
STEACE-R TEST 86

1. Connect RED clip to the indicated test point, black clip to negative ground.
2. Start Test 86, DC volts.
3. Display reading is in volts.

NOTE

VOLTAGE ON WIRE 568 SIGNALS REGULATOR TO TURN ON. WITHOUT VOLTAGE, REGULATOR CAN'T OPERATE. WIRE 568A IS CONNECTED WITH WIRE 5A INSIDE ENGINE WIRE HARNESS. IF THERE IS NO LOOSE END ON WIRE 568A, WIRE HARNESS REPAIR IS REQUIRED. NOTIFY DS MAINTENANCE.

DIAGNOSTIC FLOWCHART



REFERENCE INFORMATION

ALTERNATOR

1. Slide boot back from wire lug to expose red terminal.
2. Make contact at stud.

0-45 DC VOLTS
STE/ICE-R TEST 89

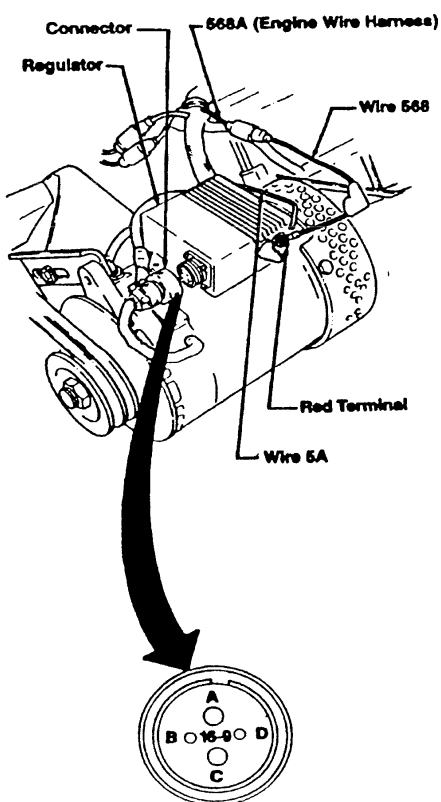
1. Connect RED clip to the indicated test point, BLACK clip to negative or ground.
2. Start Test 89, DC volts.
3. Displayed reading is in volts.

ENGINE RPM
STE/ICE-R TEST 10

1. Start test 10, Engine RPM.
2. Crank or start the engine. Displayed reading is RPM. Set engine to fast idle of 1200-1500 RPM.

0-1500 AMPS DC
STE/ICE-R TEST 90

1. Connect probe.
2. Start test 90, DC AMPS.
3. Displayed reading is in AMPS.



8-2. Misc. Vehicles

MODEL:

All TACOM Vehicles that use NSN: 5340-01-059-0114, Slave Receptacle Dust Cap

SUBJECT:

Slave Receptacle Cover

POC:

Ms. Kathy Catenaro, AMSTA-IM-MTA, DSN 786-715 1, Commercial (810) 574-7151, catenark@cc.tacom.army.mil

DEFICIENCY:

The NATO slave receptacle cover sticks, especially in cold weather. Not only does it stick, but sometimes it seizes. When this happens it is pried off, causing the cover to break.

COMMENTS:

To keep the dust cap from sticking, you can apply either a little dry graphite, NSN 9620-00-204-2643, or a thin layer of waterless hand cleaner, NSN 8520-00-965-2109 on the inside of the cover.

PUBLICATIONS AFFECTED: N/A

LEVEL OF MAINTENANCE: Unit

1 2. Tactical Trucks**MODEL:**

HMMWV M998, M998A1, M1038, M1038A1, M1097, and M1097A1

SUBJECT:

Troop Seat Safety Strap Bracket

POC:Ms. Patricia Grashik, AMSTA-IM-MTA, DSN 786-7713, Commercial (810) 574-7713,
grashikp@cc.tacom.army.mil**DEFICIENCY:**

Reports from the field indicate the troop seat safety strap brackets are breaking ,making it impossible to secure the troop safety strap. This restricts transporting of troops In the vehicle due to safety requirements.

COMMENTS:

A procedure has been developed to replace a broken troop seat safety strap bracket with a fabricated bracket. Replacement of the bracket can be accomplished in the field using the following parts, material, and procedures:

MATERIALS/PARTS:

<u>NSN</u>	<u>NOMENCLATURE</u>	<u>QTY</u>
9510-00-596-2309	Bar, Metal	AR
5310-00-933-4310	Nut, Assembled Washer	2

PROCEDURE:

1. Remove two bolts (7), bow retainer (5), two washers (4), assembled washer nuts (3), and backboard (2) from top of two channels (1) oil troop seat back (8). (see figure 3-38)
2. Remove any existing metal or weld of broken safety strap bracket (6) from channel (1) on troop seat back (8).
3. Using NSN 9510-00-596-2309 metal bar, fabricate troop seat safety strap bracket. (see figure 3-39)

3-12. Tact. Trucks cont.

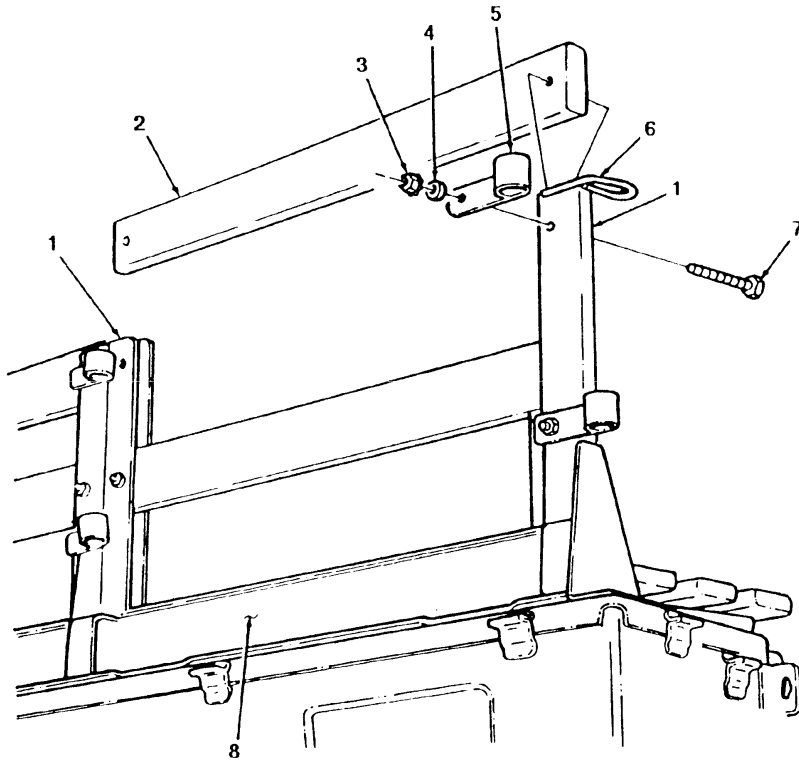
4. Weld fabricated safety strap bracket (2) to troop seat channel (1). (see figure 3-40)
5. Position existing backboard (2) to top of two channels (1) on troop seat back (8) and secure with two existing bolts (7), bow retainer (5), two washers (4), and NSN 5310-00-933-43 10 assembled washer nuts (3). (see figure 3-38)
6. Spot-paint troop seat back channel and hardware. (Refer to TM 43-0139.)

PUBLICATIONS AFFECTED:

TM9-2320-280-20

LEVEL OF MAINTENANCE:

Unit

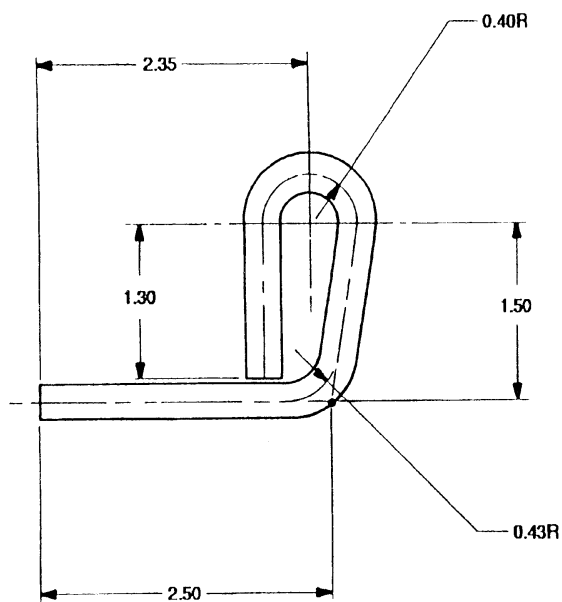


LEFT SIDE SHOWN, RIGHT SIDE OPPOSITE

FIGURE 3-38

NOTES:

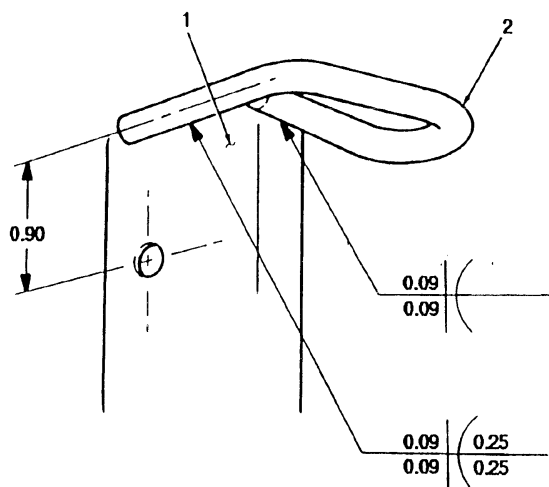
- (1) ALL DIMENSIONS ARE IN INCHES.
- (2) MATERIAL: STEEL, CARBON, BAR METAL
GRADE 1015, HOT ROLLED, IAW SPEC
ASTM A576, 0.375 DIA
- (3) REMOVE ALL BURRS AND SHARP EDGES.



SAFETY STRAP BRACKET

FIGURE 3-39

NOTE: ALL DIMENSIONS ARE IN INCHES.



LEFT SIDE SHOWN, RIGHT SIDE OPPOSITE

FIGURE 3-40

3-14. Tactical Trucks

MODEL:

M998 Series

SUBJECT:

100 Amp Alternator

POC:

Mr. Eric Sutman, AMSTA-MTA, (810) 574-7151

DEFICIENCY:

here's been some confusion about the interchangeability between the Prestolite and Niehoff models of the 100 amp alternator used on the HMMWV. We'll try to clear up this confusion with this article.

COMMENTS:

A. The HMMWV could be equipped with either the Prestolite (PN 12340912) or Niehoff (PN 12342944) 100 amp alternator. The Prestolite alternator is part of kit NSN 2920-01-199-2393. The Niehoff alternator is part of kit NSN 2920-01-371-4030. The alternator assemblies are interchangeable. The down parts, including the regulators, aren't interchangeable.

B. If your vehicle has the Prestolite alternator you can replace the alternator with the Niehoff model. The mounting brackets are the same but the wiring connections are a little different. See figure 3-7 for the proper wiring connections for the Niehoff alternator.

C. If your vehicle has the Niehoff alternator you can replace the alternator with the Prestolite model. Again, the mounting brackets are the same but the wiring connections are a little different. See TM 9-2320-280-20-3, paragraph 12-21, for the proper wiring connections for the Prestolite alternator.

D. Remember, you can't use a Prestolite regulator on a Niehoff alternator or a Niehoff regulator on a Prestolite alternator. If you need to switch from a Prestolite alternator to a Niehoff, or vice versa, you have to change out the entire alternator assembly.

PUBLICATIONS AFFECTED:

TM9-2320-280-20-3

EVEL OF MAINTENANCE:

Unit

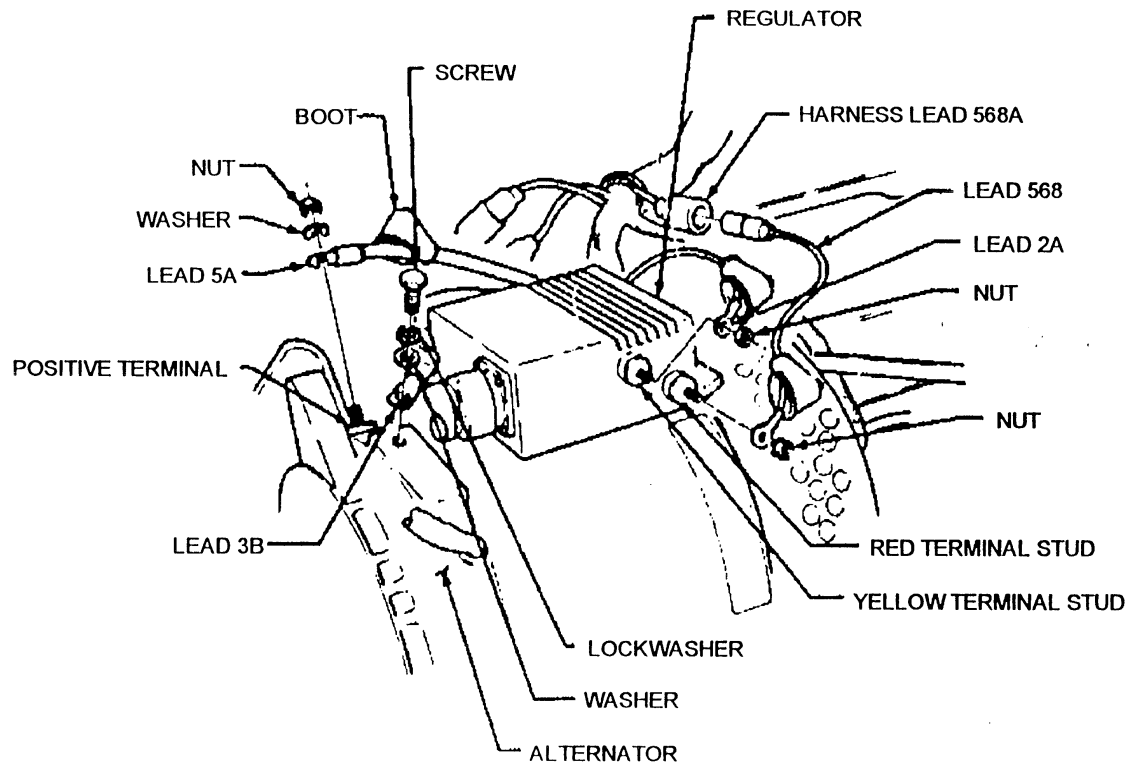


FIGURE 3-7

3-12. Tactical Trucks

MODEL:

All HMMWVs

SUBJECT:

Repair Parts Kit for 100 AMP Alternator

POC:

Ms. Jody McInerney, AMSTA-MTA, (810)574-7346

COMMENTS:

A. When you order the repair kit for the 100 AMP Alternator (P/N (19207)5703776), NSN 2920-00-472-1723, you should only receive Item 26, Rectifier and Lead and 28, Rectifier and Lead on figure 324.

B. If you want to get the other parts listed (brush, holder and stud, seals, and preformed packing) you need to order P/N (19207) 5703776-1, NSN 2920-01-222-2183. The TMs will be updated in the next change.

PUBLICATIONS AFFECTED

TM9-2320-280-34P

LEVEL OF MAINTENANCE:

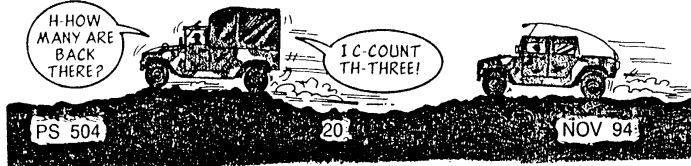
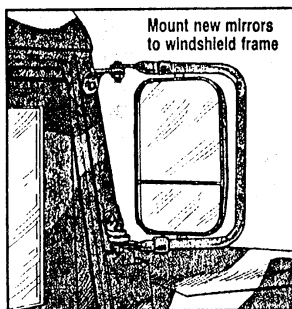
Direct Support

For a Clear View

The older HMMWV side view mirrors vibrate so much that you can't see what's behind you. For a clear view, look no further than Fig 348 of the -20P TM to get a "West Coast" mirror.

The larger mirror also has a convex, wide-angle view area that makes driving a lot safer. Order a left and right mirror kit with NSN 2540-01-302-2595.

Then use riveter, NSN 5180-01-201-4978, from the HMMWV's special tools, to install the blind rivnuts that come with the kit. They'll keep the mirrors from falling off.



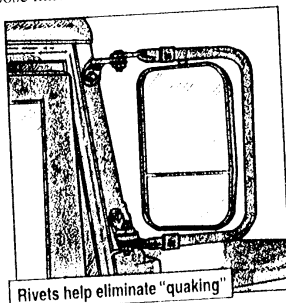
Stop "West Coast" Quakes

Sometimes you've got to put up with shakes and shimmies—that ol' HMMWV rattles pretty good even at idle. That means those "West Coast" mirrors shake, too. It's something you get used to.

What you don't have to put up with are loose mirror mounts that cause heavy-duty quaking and even lost mirrors.

Keep mirrors tight by using the rivet installation tool kit, NSN 5180-01-210-4978, from the special tools list in TM 9-2320-280-20P.

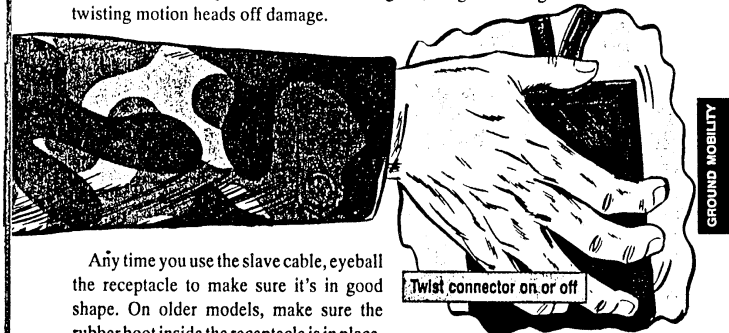
The riveter, when used as described on Page 10-110 of the -20-3 TM, clinches each rivet shank against the windshield metal. It's as tight a mount as you're going to get.



Twist Off Cable Connector

Twist the connector when you connect or disconnect your HMMWVs slave cable. Never just push or pull the connector.

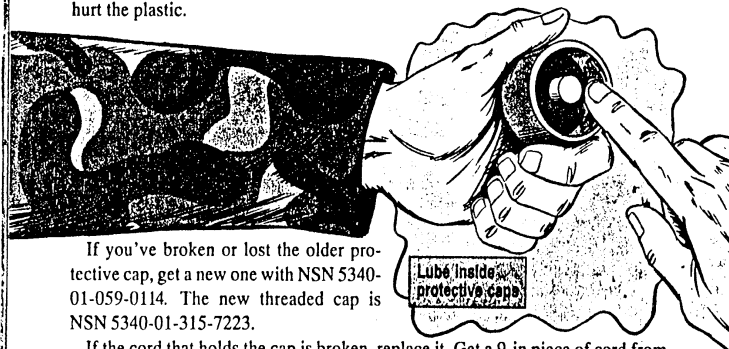
Because the receptacle is made of fiberglass, rough handling will break it. A twisting motion heads off damage.



Any time you use the slave cable, eyeball the receptacle to make sure it's in good shape. On older models, make sure the rubber boot inside the receptacle is in place.

If the boot is missing, you can short out the cable, damaging equipment or people.

Older slave receptacle protective caps are held on by friction. To let those caps slip on and off easier in both cold and hot weather, lube them. Use a little waterless hand cleaner, NSN 8520-00-965-2109, on the inside. This lube won't dry out or hurt the plastic.



If you've broken or lost the older protective cap, get a new one with NSN 5340-01-059-0114. The new threaded cap is NSN 5340-01-315-7223.

If the cord that holds the cap is broken, replace it. Get a 9-in piece of cord from spool, NSN 4020-00-246-0688. Terminal rings to fasten the cord to the cap and to the vehicle are NSN 5940-00-143-4794. Use pliers to crimp the terminal rings.

PS 513

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AUG 95

33-46

HMMWV ...

MIRROR REFLECTIONS

Dear Editor,

For blackout conditions, HMMWV side mirrors must be turned inward so they don't give away your position.

Some HMMWV drivers push in the entire mirror frame. But that causes the frame to work loose from the body of the truck. On a rough trip, the mirrors could actually bounce themselves right off the truck.

We save wear and tear on the frame by telling drivers to turn just the mirror inward and leave the frame alone.

SGT Jesus Mora
SSG William Kreutzer
C Co, 2/6 ADA
Ft Bliss, TX

FROM THE DESK OF THE Editor

Your suggestion is certainly something to reflect on.

Course, you may still want to fold the mirror frame against the truck body when you're traveling through thick brush. (If you don't want to move the mirror at all, use cloth—or even mud—to cover the glass).

You don't have to put up with loose mirrors, though. Use the rivet installation tool kit, NSN 5180-01-201-4978, to rivet the frame tight. Instructions are on Page 10-110 in TM 9-2320-280-20-3. Also make sure you have the new nut insert, NSN 5310-01-413-3276. It holds better than the old insert.

If you haven't gotten the new "West Coast" mirror, it comes with NSN 2540-01-302-2595.

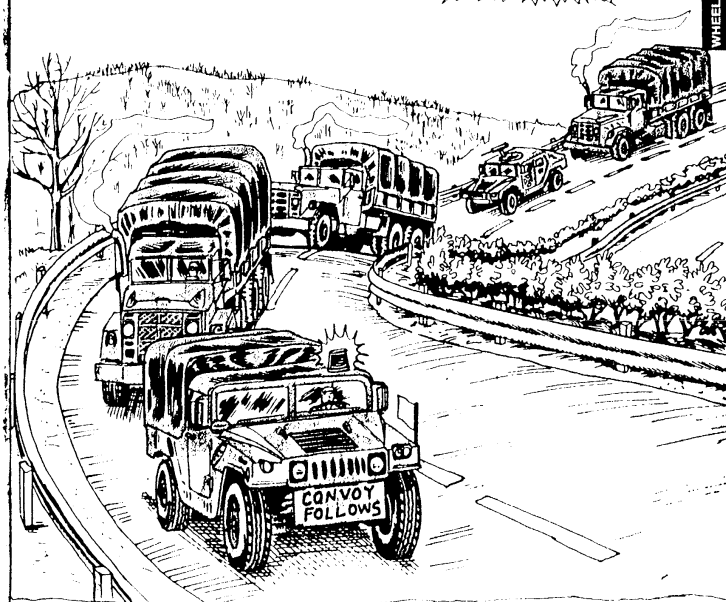
JUST TURN
THE MIRROR, NOT THE
FRAME.



Warning Light Kits ...

Watch Out for RAWLS

WHEELED VEHICLES



So you need a rotating amber warning light (RAWL) to meet the requirements of Para 2-16G of AR 385-55? That's 'cause you're the first or last vehicle in a convoy.

Most big truck and recovery vehicle TMs list warning light kits, but if yours doesn't, your CO can OK the kit for your vehicle. Here's what you need:

For 2½- and 5-ton dump trucks, ask for NSN 6220-01-219-7620. The 5-ton expansible van takes NSN 6220-01-219-7621.

For all other 2½- and 5-ton trucks (including M816 and M936 wreckers), use NSN 6220-01-195-1791. For CUCVs, HMMWVs and all M747, M871 and M872 semitrailers, you need NSN 2590-01-107-9696.

These kits don't come with an amber bubble light. To get one, use NSN 6220-00-947-7570.

The printed word on all light kits is found in TB 9-2590-510-23.

PS 529

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Chapter 47

GAGES AND MEASURING DEVICES

Functional
Group Code
4701

3-11. Tactical Trucks

MODEL:

HMMWV

SUBJECT:

Speedometer Cable Design Improvement

POC:

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DEFICIENCY:

Reports from the field indicate that the speedometer cable routing through the cowl has too small of a radius, causing the cable to kink and become inoperable.

COMMENTS:

Procedures have been developed to install a longer speedometer cable, with a larger bend radius. The instructions and parts required can be obtained by ordering NSN 2590-01-433-8553, PN (19207) 57K3491.

PUBLICATIONS AFFECTED :

TM9-2320-280-20

TM9-2320-280-24P

LEVEL OF MAINTENANCE:

Unit